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AUTOMOBILE EXHAUST EMISSION SURVEILLANCE ANALYSIS OF THE FY 73 PROGRAM

J. Bernard, et al

Calspan Corporation
Buffalo, New York

July 1975

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TECHNICAL REPORT DATA
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1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA-460/3-75-007		

4. TITLE AND SUBTITLE	5. REPORT DATE
Automobile Exhaust Emission Surveillance Analysis of the FY73 Program	July, 1975
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
J. Bernard, P. Donovan, H.T. McAdams	
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO.
Calspan Corporation 4455 Gennessee Street Buffalo, New York 14221	11. CONTRACT/GRANT NO. 68-03-0486
12. SPONSORING AGENCY NAME AND ADDRESS	13. TYPE OF REPORT AND PERIOD COVERED
Environmental Protection Agency Office of Mobile Source Air Pollution Control Certification and Surveillance Division Ann Arbor, Michigan 48105	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Emission Factor Program provides a realistic assessment of the effectiveness of Federal air pollution regulations by testing production vehicles in the hands of the motoring public. This report summarizes the results of the FY 73 Emission Factor Program and compares these results with those obtained in earlier Emission Factor Program. The FY 73 Program tested 1,080 1967-1974 model-year vehicles in six cities.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Exhaust Emissions Air Pollution Motor Vehicles Surveillance	PRICES SUBJECT TO CHANGE	13B

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Unlimited	Unclassified	65
1.	20. SECURITY CLASS (This page) Unclassified	22. PRICE 4.50 - 2.25

EPA Form 2220-1 (9-73)

013061

PB 248 600

EPA-460/3-75-007

July 1975

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U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Mobile Source Air Pollution Control
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by

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Contract No. 68-03-0486

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Prepared for

U. S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
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Publication No. EPA-460/3-75-007

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1. SUMMARY, CONCLUSIONS AND BACKGROUND

This publication is the third in a series of reports aimed at summarizing information on emissions from light-duty vehicles. State and local agencies, Federal air pollution officials, automobile manufacturers and concerned citizens can use this summary to estimate the impact of light-duty vehicle emissions on air quality and to determine conformity of vehicles to the standards under which they were certified.

Source data for the report are the exhaust emission test findings of three individual contractor reports prepared as part of the Fiscal Year 1973 (FY 73) EPA Emission Factor Test Program [see References (1), (2), (3)].* The exhaust emission tests were performed in accordance with the 1975 Federal Test Procedure (FTP), which allowed calculation of grams-per-mile results with both 1972 and 1975 FTP weighting factors. The 1972 FTP weighting is used primarily throughout this report since this method was used in certification of the 1972, 1973 and 1974 models. Using the 1975 FTP weighting, one may compare performance of pre-1975 vehicles with those certified for 1975 and later model years. For more detailed information on specific vehicle tests or the results thereof, consult the appropriate test contractor reports.

The EPA Emission Factor Program is an on-going study which obtains current emission data on in-use vehicles. The vehicles tested in the program are randomly selected to represent the national population of in-use vehicles during the Fiscal Year under consideration. This on-going effort updates emissions data first obtained in 1971 by the 1972/1975 FTP and adds new data from the latest model year. Where possible, therefore, results from the FY 73 Emission Factor Program are compared with corresponding results from the FY 71 and FY 72 Emission Factor programs [see References (4), (5)].

* Though a part of the Emission Factor Program, evaporative emissions are not the subject of this summary report.

1.1 SUMMARY

The FY 73 EPA Emission Factor Program consisted of exhaust emissions tests on 1967 through 1974 model-year in-use automobiles and light trucks under 6000 pounds gross weight. Tests of hydrocarbon (HC), carbon monoxide (CO), oxides of nitrogen (NOX) and carbon dioxide (CO_2) emissions were performed on 180 vehicles in each of six cities: Los Angeles, Denver, Detroit, St. Louis, Houston and Newark. These test locations represent heavily populated areas of diverse climate, terrain and associated driving practices and use patterns. Los Angeles represents the temperate, warm western part of the nation while Denver, at a mile high elevation, represents mountainous metropolitan areas. Detroit, representing the Great Lakes and northeast sector, is typical of cities with long winter seasons. The Great Plains region is represented by St. Louis with moderate winters and Houston with a very warm, humid climate. Finally, Newark is an eastern seabord city. Being subject to the exhaust emission inspection program of New Jersey, Newark is distinguished from eastern seabord cities outside the state. The inspection program did not become mandatory, however, until February 1, 1974.

As in the FY 71 and FY 72 programs, average emission levels in Denver differed significantly from those in all other cities sampled. On the other hand Los Angeles, distinguished from all other cities in the FY 72 program, was not found significantly different from St. Louis and Newark. Finally, there were no significant differences in emission levels in Houston and Detroit. In all cases, a difference in mean emission levels for vehicles from two cities was adjudged to be significant if two conditions were met. First, it was necessary for the observed difference between the means to be statistically significant at the 95% significance level. Second, the magnitude of the observed difference between the means had to be at least 10% of the average emission level for vehicles from the two cities combined. Both statistical significance and the magnitude of the difference were taken into account to avoid attaching undue importance to situations in which statistical significance is indicated but the actual difference between average emission levels is negligibly small. Such situations can arise if the average emission levels are based on a large number of vehicles.

A summary of the results of the FY 73 EPA Emission Factor Program is presented on the following page. Results for all cities are reported separately. However, as in previous Fiscal Year programs, results for all cities except Denver and Los Angeles are pooled. Further discussion on the pooling technique will be found later in this report. Emission rates are reported in terms of arithmetic means and standard deviations but, for reasons disclosed later in the text of this report, fuel economies are reported in terms of harmonic means and standard deviations.

One of the most noteworthy factors affecting the FY 73 program was the imposition, for the first time, of a nationwide standard for oxides of nitrogen. The influence of the new standard can be seen by comparison of current model-year vehicles in the FY 71, FY 72 and FY 73 programs (see table page 5). The question of interest is whether 1973 model-year in use vehicles had lower emissions in their first year of operation than did 1972 and 1971 model-year vehicles in their first year of operation. As can be seen in the table, the most dramatic reductions in emissions are those for NOX, and these reductions are offset by either increases or less appreciable decreases in HC and CO emissions.

The results of this table should be interpreted in light of three major factors. First, when comparing FY 72 with FY 71, it should be noted that vehicles sold in California were required to meet NOX emission standards in the 1971 model year and more stringent NOX emission standards in the 1972 model year, whereas vehicles sold in other states were exempt from any NOX standards during these two model years. Second, 1972 was the first model year when national HC standards were 3.4 gm/mi and CO standards were 39 gm/mi. To meet the new more stringent standards, many manufacturers completely redesigned their pollution control systems for the 1972 model year production. These two factors may partially explain why mean HC and CO emissions increased in Los Angeles and decreased only slightly in the other lower altitude cities from

FY 73 EMISSION FACTOR PROGRAM

SUMMARY TABLE OF EMISSION LEVELS USING

THE 1972 FTP

City	Number of Vehicles Tested	Mean Miles (Thousands)	Hydrocarbons GMS/MI Arithmetic		Carbon Monoxide GMS/MI Arithmetic		NOX GMS/MI Arithmetic		Fuel Economy MI/GAL Harmonic		Idle Hydrocarbons Parts Per Million Hexane		Idle Carbon Monoxide Percent CO	
			MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
Houston	180	41.5	5.95	3.76	80.69	47.38	5.27	2.46	10.91	2.31	390	310	3.1	2.1
Detroit	180	37.7	6.71	7.26	77.21	50.01	5.14	2.07	11.67	2.60	435	436	3.5	2.2
St. Louis	180	42.7	4.86	3.17	69.13	43.87	3.62	1.44	12.94	3.11	214	272	3.0	2.5
Newark	180	37.3	5.59	5.38	63.21	41.88	3.59	1.31	13.01	3.12	382	435	3.2	2.8
4 Cities Averaged	720	39.8	5.78	5.18	72.56	46.30	4.41	2.04	12.07	2.89	354	380	3.2	2.4
Denver	180	37.1	6.87	2.99	108.54	43.35	2.84	1.41	12.23	2.84	357	265	3.8	2.3
Los Angeles	180	43.5	5.44	5.95	65.21	52.94	3.27	1.34	12.77	3.22	262	321	2.0	2.0

COMPARISON OF MEAN EMISSION RESULTS FROM FY 71,

FY 72 and FY 73 EMISSION FACTOR PROGRAMS

(1972 FTP) **

Locations	Average Mileage (in thousands)	HC gm/MI	CO gm/MI	NOXC gm/MI
Four Cities***				
FY71 Program, 1971 Model year Vehicles	15.6	3.42	46.33	4.99
FY72 Program, 1972 Model year Vehicles	14.8	3.42	43.79	4.52
FY73 Program, 1973 Model year Vehicles	18.1	4.07	53.40	3.47
Percent Reduction:				
71 to 72		0%	5%	9%*
72 to 73		-19%*	-22%*	23%*
71 to 73		-19%*	-15%	30%*
Los Angeles				
FY71 Program, 1971 Model year Vehicles	15.8	3.51	51.90	3.81
FY72 Program, 1972 Model year Vehicles	17.6	4.07	55.77	3.83
FY73 Program, 1973 Model year Vehicles	21.5	4.27	47.93	3.00
Percent Reduction:				
71 to 72		-16%	-7%	0%
72 to 73		-5%	14%	22%*
71 to 73		-22%	8%	21%*
Denver				
FY71 Program, 1971 Model year Vehicles	15.2	6.73	100.04	3.04
FY72 Program, 1972 Model year Vehicles	14.1	5.61	90.42	3.00
FY73 Program, 1973 Model year Vehicles	14.3	5.03	93.34	1.99
Percent Reduction:				
71 to 72		17%	10%	1%
72 to 73		10%	-3%	34%*
71 to 73		25%*	7%	35%*

* Significant at 95% level

** 1974 vehicles tested in FY 73 are omitted in this comparison since mean mileages of 74 vehicles are about 5K miles which is considerably less than the 14K-20K miles for vehicles used in this table.

*** FY71 and FY72 - Chicago, Houston, St. Louis, Washington, D.C.
FY73 - Detroit, Houston, St. Louis, Newark

1971 to 1972. Third, when comparing FY 1973 with FY 72 and FY 71, it should be noted that 1973 was the first model year when national NOX standards were 3.0 gms/mi. Since the NOX emissions are negatively correlated with HC and CO emissions, attempts by the manufacturers to meet the new NOX standard appears to have resulted in increases in HC and CO for the four city locations.

For the FY 73 program additional tests were performed on light duty vehicles to determine the effect of air conditioning and vehicle loading on emission levels and fuel economy. In general, HC, CO and NOX emissions were higher and fuel economy lower for vehicles tested with their air conditioning operating as opposed to the same vehicles tested with their air conditioning not operating. Results of vehicles tested to determine the effects of loading on emission levels and fuel economy showed large increases in emission and large decreases in fuel economy for vehicles towing trailers.

1.2 CONCLUSIONS

Results of the FY 73 EPA Emission Factor Program summarized in this report reveal that:

1. Exhaust emissions for any specific vehicle depend on a great number of factors.

2. Certain differences and similarities among cities were observed in emission results. Carbon monoxide and hydrocarbon emissions tended to be higher in Denver than in other cities, whereas oxides of nitrogen tended to be lower. The observed differences are believed to be attributable to the effect of altitude on air-fuel ratios. For this reason Denver was segregated from the low-altitude cities in the compilation of emission results. In recognition of the different emission standards applicable to certain model year vehicles in California than in other states, Los Angeles was segregated from other low-altitude cities, even though results from Los Angeles were similar to results from St. Louis and Newark. Though significant differences were observed among the remaining four low-altitude cities, results from these cities were pooled to provide a more representative base for low-altitude emission factors.

3. Individual vehicles of a particular group show wide dispersion in exhaust emissions. Consequently, two groups of vehicles, for example populations of vehicles tested in two different cities, may show considerable overlap of their statistical distributions even though the mean emissions for the two groups are appreciably different. Generalizations with regard to make, city or other categories of interest, therefore, are often not applicable to comparison of individual vehicles or small subsets of vehicles drawn from the two categories.

4. Tests of 1973 and 1974 model year light duty vehicles indicate the following percent of vehicles were at or below the 1973/1974 Federal Standards for HC (3.4 gms/mi), CO (39.0gms/mi) and NOX (3.0 gms/mi).

	POLLUTANT	FOUR CITIES (140 Vehicles Tested)	DENVER (35 Vehicles Tested)	LOS ANGELES (35 Vehicles Tested)
1973 Model Year Vehicles	HC	43% or 60	20% or 7	57% or 20
	CO	38% or 53	8% or 3	60% or 21
	NOX	42% or 59	89% or 31	57% or 20
	ALL THREE	14% or 19	3% or 1	20% or 7
		(40 Vehicles Tested)	(10 Vehicles Tested)	(10 Vehicles Tested)
1974 Model Year Vehicles	HC	58% or 23	0% or 0	70% or 7
	CO	63% or 25	0%	50% or 5
	NOX	65% or 26	90% or 9	90% or 9
	ALL THREE	45% or 18	0%	30% or 3

5. Light duty vehicles tested in the FY 73 program show a general downward trend in HC, CO and NOX emissions from the 1966-1967 model years (pre-control in all cities except Los Angeles) to the model year 1973. Note, however, that this apparent trend must be interpreted in light of the fact that new vehicles with low mileage are compared with older vehicles with larger mileage. This trend is shown by the average emission levels based upon the 1972 Federal Test Procedure (see Table page 9). Note that the one increase in NOX for Los Angeles is not significant at the 95% confidence level. 1974 model year vehicles tested in FY 73 show an even greater reduction in emissions from 1966/1967 to 1974.

FY 73 EMISSION LEVELS (GM/MI)

1972 FEDERAL TEST PROCEDURE

(1967 Vehicles Are Pre-Control In All Cities
Except Los Angeles)

LOCATION	HC gm/MI	CO gm/MI	NOXC gm/MI	MEAN MILES (K)
Four City				
1967 Vehicles	9.75	121.08	3.97	68.1
1973 Vehicles	4.07	53.40	3.47	18.1
1974 Vehicles	3.42	41.03	2.88	5.8
Percent Reduction				
67 - 73	58%*	56%*	13%*	
67 - 74	65%*	66%*	27%*	
Los Angeles				
1967 Vehicles	7.58	87.06	2.88	62.1
1973 Vehicles	4.27	47.93	3.00	21.5
1974 Vehicles	3.26	40.82	2.23	11.3
Percent Reduction				
67 - 73	44%	45%*	-4%	
67 - 74	57%	53%*	23%	
Denver				
1967 Vehicles	11.02	156.94	2.26	66.4
1973 Vehicles	5.03	93.34	1.99	14.3
1974 Vehicles	4.47	83.37	1.84	5.3
Percent Reduction				
67 - 73	54%*	41%*	12%	
67 - 74	59%*	47%*	19%	

* Significant at 95% Level

6. Comparison of the results of the FY 71, 72 and 73 Emission Factor programs reveals a general tendency for HC and CO emissions to increase with increasing vehicle age and/or mileage. However, the confounding effects of vehicle maintenance, vehicle population variation and other more subtle effects from FY to FY make the estimation of an age or mileage effect uncertain.

7. The FY 73 Emission Factor Program was the first program in which the effects of air conditioning and vehicle loading upon emissions and fuel economy were measured. Results indicate that for tests on air conditioned vehicles performed in Houston and Detroit, emission levels were generally higher and fuel economy lower when the air conditioning system was in operation. Results for tests on vehicles with an additional 500 pounds inertia weight to simulate an added load of passengers or luggage, indicate no significant effect on vehicle emissions or fuel economy. However, results for vehicles with an additional 1000 pounds inertia weight and an increased road load horsepower to simulate vehicles towing trailers indicate a large decrease in fuel economy accompanied by a large increase in vehicle emissions. For these tests, the increased road load horsepower was determined from actual road tests.

1.3 BACKGROUND

The Congress, through the enactment of the Clean Air Act of 1963 and amendments thereto, provided for a national air pollution program to monitor and control emissions from new motor vehicles. Administrative responsibility for the air pollution control program is vested with the U.S. Environmental Protection Agency (EPA).

The first nationwide standards for exhaust emissions, together with the testing and certification procedures, were issued in 1966 and were applicable to 1968 model year passenger vehicles and light-duty trucks sold within the United States. Levels for maximum allowable exhaust emissions were imposed initially on HC and CO pollutants only. Hydrocarbons were restricted to 275 parts per million concentration and carbon monoxide was restricted to 1.5 percent. These pollutants were measured using the 7-mode cold-start test procedure.

More stringent standards on a mass equivalent basis were introduced for 1970 and 1971 model year vehicles. The Federal standards based on the 7-mode procedure, expressed in mass equivalents, were 2.2 grams/mile for HC and 23 grams/mile for CO. In 1972, a change was made to a new test procedure. This procedure contained a new sampling method, the Constant Volume Sampling Procedure (CVS), and a new driving sequence. At that time the standards were again strengthened. HC was restricted to 3.4 grams/mile and CO was restricted to 39.0 grams/mile. The numerical increase in the standards from 1971 to 1972 reflects the increased stringency of the testing procedures. In terms of the 1972 test procedure, the 1971 standards were equivalent to approximately 4.6 grams/mile for HC and 47 grams/mile for CO. The first Federal Standards applicable to oxides of nitrogen were promulgated for 1973 model-year light-duty vehicles and were set at 3.0 grams/mile. The first Federal evaporative emission standards were introduced for 1971 model-year vehicles.

Under the Clean Air Act, manufacturers are required to submit applications containing data gathered during both phases of a two-part test program in order to qualify for certificates of conformity. The first phase of testing provides data on exhaust emissions which show the performance of the control equipment after the engine has been broken in, but before substantial mileage has been accumulated. These data are known as 4,000 mile emission data. The second phase of the test program provides data on the durability of the emission control system. These data are known as 50,000 mile durability data.

For 1968-1971 model year vehicles, compliance was demonstrated whenever the mean emission level from a specified sample of emission-data prototypes of each engine displacement, weighted according to projected sales volume, was within the applicable standard. This mean incorporates a deterioration factor determined from a sample of durability-data prototypes representative of at least 70% of the manufacturer's engine displacement/ transmission options. Inherent in this method of certification is the fact that mean values for HC or CO are near the levels specified in the standard though as many as 50% of certification or in-use vehicles could be above the standard for either pollutant. (The 50% figure assumes that emissions of prototype vehicles are normally distributed. In the case of lognormality, less than 50% but still an appreciable fraction of the vehicles could be above the standard.)

For 1972 and subsequent model year vehicles, every vehicle tested in the certification sample must have emissions below the level of the applicable standard. The certification prototypes are tested with vehicle parameter settings, e.g. engine timing, at or near the mean of the allowable production range. Therefore, to the extent that emissions vary within the allowable range of parameter settings, some percentage of production vehicles might be expected to emit pollutants above the certified standard. At the present time, no data exist to quantify this percentage.

EPA has recognized that a realistic assessment of the effectiveness of Federal air pollution regulations requires the measurement of emissions from production vehicles in the hands of the motoring public. Accordingly, a series of exhaust emission surveillance programs has been administered by the EPA during the past several years to obtain such definitive information. Test fleets of consumer-owned vehicles within various major cities were selected by make, model, engine size, transmission, and carburetor categories in such proportion as to be representative of the normal production vehicles sold (or projected to be sold) for that model year in the United States.

The principal objective of such surveillance programs is to gather emissions data from a representative sample of in-use motor vehicles. Using the data from the surveillance programs, the Surveillance Branch works with the National Air Data Branch (NADB) and the office of Transportation Land Use Policy (OTLUP) to develop appropriate in-use vehicle emission factors from which emission source inventories, vehicle emission control strategies, and emergency episode pollution abatement procedures can be developed. In addition, modal data are collected which are used to model the effect of automobile emissions under arbitrary traffic and road network conditions in order to evaluate transportation control systems.

2. EMISSION FACTOR PROGRAM DESIGN

The Emission Factor Program is designed to yield emission factors which are representative of the national distribution of vehicle miles traveled by in-use vehicles. Accordingly it is necessary to determine, for each model year, the appropriate number of vehicles to be tested. This number is determined according to the contribution made by vehicles of that model year to the total number of vehicle miles traveled by in-use vehicles. Further, within each model year the vehicle sample is allocated by vehicle make, engine size, carburetor type and transmission type on the basis of vehicle sales within each category. To ensure a valid statistical sample, the appropriate number of vehicles within each designated group or stratum is selected by a random process. The vehicles tested are in customer use and are tested in an as-received condition so that the sample can reflect variability in usage, maintenance and repair practices.

In addition to the usual emission factor tests, the FY 73 program included tests designed to satisfy certain study objectives. One of these objectives was to determine the effect of air conditioning on emissions. Another was to determine the effect on emissions of additional loading, such as the towing of a trailer, or the addition of extra passengers or baggage. Also included in the program was the measurement of modal mass emission data for vehicles from each of the six cities. Analysis of the modal data is being treated separately and is not a subject of this report. A study of the repeatability of emission tests was conducted by replicate testing of 20 vehicles in Denver and 20 vehicles in Los Angeles. Results of statistical tests on replicate data appear later in this report.

Air conditioned vehicle emission data for emission factors development were generated using twenty (20) vehicles each in Houston and Detroit. The testing sequence was conducted on vehicles equipped with factory installed air conditioning systems. The vehicles were operated from a hot start over the 1972 FTP Driving Sequence. Testing was such as to allow calculation of emission factors for vehicles with the air-conditioning system operating.

Tests were performed on 42 Detroit area vehicles using modal mass sampling techniques at three load conditions. The first was at the inertia weight and road load settings of the Federal Register. The second was at a higher inertia weight leaving the road load settings the same as in the first test to simulate the addition of passengers and baggage. The third was at an even higher inertia weight and a higher road load setting to simulate the addition of a towed vehicle. For this test the appropriate road load power settings were determined empirically from actual road tests of the vehicles.

2.1 FY 73 TEST VEHICLE SELECTION AND HANDLING PROCEDURE

In each of the six cities, a sample of 1967 through 1974 automobiles representative of the nationwide vehicle population profile was selected. The vehicle sample was chosen on the basis of model year, make, carburetor, and transmission categories. All vehicles were inspected for compliance with these established criteria prior to final acceptance. Before testing, vehicles were inspected to confirm acceptability. In some cases, vehicles were rejected because of leaky exhaust systems or for safety reasons.

Test vehicles were scheduled for testing at each of the laboratories in accordance with the respective laboratory work load and manpower capabilities. To encourage participation, incentives included fully insured loan cars and a $25 U.S. Savings Bond.

The constant volume sampling technique by the 1975 Federal Test Procedure was used for determination of exhaust emissions. Upon completion of testing, engine diagnostic procedures were performed which included basic timing, point dwell, and idle rpm. HC and CO were analyzed at idle using a garage-type analyzer.

3. STATISTICAL ANALYSIS

Statistical analysis of the FY 73 emission factor data was performed with a view toward consolidation of information and the identification of trends and generalizations. In this analysis the results of emissions are presented, for the most part, in the form of arithmetic and geometric means and standard deviations. The results of fuel economy calculations are presented in the form of harmonic means and standard deviations.

A word of explanation is in order with regard to the geometric mean and standard deviation and their interpretation in an emission context. There is evidence that emissions data tend to follow a lognormal rather than a normal distribution. Consequently, if the emission values are subjected to a logarithmic transformation, the logarithms tend to follow a normal distribution, and means and standard deviations can be computed for these logarithms and interpreted in much the same way as for any other normal distribution. However, if the inverse transformation is applied to these statistics, the resulting antilogarithms represent geometric means and standard deviations.

Geometric means and standard deviations must be interpreted in a multiplicative rather than an additive sense. If the geometric mean is multiplied by the geometric standard deviation, one obtains a quantity which represents approximately the 84th percentile of the distribution, in much the same way as one obtains this percentile in a normal distribution by adding the standard deviation to the mean. Similarly, by multiplying the geometric mean by the geometric standard deviation squared, one obtains approximately the 95th percentile of the distribution in much the same way as one obtains this percentile in a normal distribution by adding two standard deviations to the mean.

A major consequence of the lognormal characteristic of emission data is that the distributions tend to be skewed to the right. Toward the low side of the distribution emissions tend to be bounded more strictly than on the high side. In particular, a vehicle can exhibit quite high emissions but only under very special conditions can a vehicle exhibit emission results which are negative in value. Because of this implicit skewness in emissions data, the mean emission level of a group of vehicles must be looked at independently of

the fraction of these vehicles which conform to a standard. The arithmetic mean of a group of vehicles is useful in assessing the impact of that group of vehicles on air quality. However, for purposes of estimating the fraction of individual vehicles which comply with standards the geometric mean and standard deviation are often more useful. It is for these reasons that both arithmetic and geometric means and standard deviations are reported. Fuel consumption or fuel economy, however, is computed on a per-mile basis by means of a carbon-balance approach. Because the fuel consumed over a fixed distance is the random variable, the fuel economy must be expressed recriprocally by harmonic means and standard deviations.

3.1 EMISSION DATA AND RESULTS

The results of the FY 73 Emission Factor Program are summarized in Tables 1 through 57. For Tables 1 through 27, it will be noted that Los Angeles and Denver are treated separately from the remaining four cities, in conformance with the method of aggregating results in the FY 71 and FY 72 programs and to facilitate comparison with these previous years. In addition, results for the remaining individual cities are given in Tables 28 through 55 inasmuch as some departures from the city-based trends of previous years were noted. Table 56 presents the results of emission tests on air-conditioned vehicles and Table 57 gives results on the effect of increased loading on emissions and fuel economy.

Tables 21 through 23 present the percentage of vehicles with emissions which are no greater than the 1972 Federal Standards of 3.4 gm/mile for HC and 39.0 gm/mile for CO, and the added 1973/1974 Federal Standard of 3.0 gm/mile for NOX. The emission data used for comparison were based upon the 1972 FTP. Also presented are the number of vehicles complying with the standards. The percent of vehicles complying with standards for each individual pollutant are reported in Tables 10-12 in conjunction with emission levels for the 1972 FTP.

Tables 13 and 27 give the 1972 and 1975 Federal Test Procedure results by model year and inertia weight for the combined cities of Detroit, Houston, St. Louis and Newark. The tables contain the arithmetic means and standard deviations of the 1972 and 1975 FTP emission results in grams/mile.

In this report, five hundred pound increments are used to establish class boundaries from 2000 to 5000 pounds. Individual tables based upon Los Angeles and Denver data are not presented since the number of observations per cell becomes extremely small.

3.2 DISCUSSION

In the following sections the data from the FY 73 Emission Factor Program are reviewed from the standpoint of city effects, degradation effects such as the effect of mileage on emissions, and time trends revealed from a comparative study of the FY 71, FY 72 and FY 73 programs. Particular attention is given to the performance of vehicles during their first year of operation. Also included are discussions of results from emission tests on air-conditioned and loaded vehicles, an evaluation of fuel economy as deduced from emission data, and an analysis of replicate tests performed on forty vehicles.

3.2.1 City Effects

The term "city effect" means that some feature of the emission results for a particular city distinguishes that city from other cities in the test program. As in the FY 71 and FY 72 programs, the most notable city effects were those associated with Denver. Denver vehicles produced significantly higher levels of hydrocarbons and carbon monoxide and lower nitrogen oxide emissions than did vehicles in other cities. The principal considerations distinguishing Denver is its altitude, which affects carburetion and tends to produce richer fuel mixtures.

Certain similarities among cities were noted as the result of statistical tests of significance and engineering comparisons of the magnitudes of emissions in the several cities. Some of the similarities which emerged for the first time in the FY 73 program are believed to be a consequence of the fact that 1973 was the first model year in which vehicles in all cities were required to meet NOX standards. Of particular note in this connection is the relation of Los Angeles to other cities in the program. In FY 71 and FY 72

Los Angeles exhibited higher carbon monoxide emissions than the other cities in these programs. In FY 73, however, Los Angeles can not be distinguished from St. Louis and Newark with regard to any of the pollutants. For consistency in comparing FY 73 emission results with those of previous years, emission results for Los Angeles as well as for Denver were segregated from results for the other four cities. It should be noted, however, that the four cities aggregated in the FY 73 program are not the same as those aggregated in the previous fiscal years. For FY 73, Chicago was replaced by Detroit and Washington was replaced by Newark. Although the respective cities involved still represent the same geographic and climatological conditions as in the previous program, the fact that a different mix of cities was involved is worthy of note. For this reason the results on individual cities are also included in this report. Also included for comparison are basic summaries of test results from the FY 71 and FY 72 programs. These are found in the Appendix.

3.2.2 Degradation Effects

Degradation effects stem from factors which operate to counteract emission controls. Mileage accumulation is one of these factors, but it is difficult to isolate the effect of mileage from the effects of various other factors causing deterioration of emission control performance, such as state of engine adjustment and repair. Often these additional factors are positively correlated with mileage accumulation and provide the mechanism by which mileage accumulation is translated into increased levels of emission.

Tables 17, 18 and 19 provide insight into the effect of deterioration influences on emission levels and can be viewed in two ways:

First, one can compare FY 71, FY 72 and FY 73 results for a particular model year. An increase in average mileage with age is noted as one moves from the FY 71 to the FY 73 results. The change in average emissions is not nearly as consistent. Not only do the increases in average emissions between test years vary considerably, but there is also uncertainty in the value of each increase due to the large standard deviations of the average

emissions estimates.

Second, one can compare different model years within a specific Fiscal Year program. Again, a consistent relationship between age and mileage and an inconsistent trend of increasing emissions with age/mileage are observed. However, model year design difference is also a factor contributing to emission changes and it is difficult to separate deterioration from design influence.

On the other hand, fuel economy appears to be little changed when analyzing results for various model year vehicles within a particular FY program and for various FY programs within a particular model year. A possible reason for this observation may be that the mix of vehicles has changed from FY to FY and model-year to model-year in such a way as to compensate for any deleterious effect of emission controls increasing weight or other factors affecting fuel economy.

In summary, it is evident that there exist factors which tend to produce deterioration in the effectiveness of emission controls with continued vehicle use. However, the two year span of the surveillance programs to date, and the large variance in the results, do not allow for precise estimates of the rate or duration of emission control deterioration. Our knowledge of the rate, duration, cause, and control of emission control deterioration will increase as future surveillance programs lengthen the span of emission data and as the results of testing in areas with inspection/maintenance programs become available.

3.2.3 Fuel Economy

By virtue of the fact that the carbon dioxide (CO_2) output was measured in addition to the output of CO and HC for each of the vehicles tested, it is possible to compute fuel consumption on a per mile basis by means of a carbon-balance approach. The total carbon content of a gallon of gasoline is known, and this carbon must be recovered after combustion as either HC, CO or CO_2. By virtue of the fact that carbon input and carbon output must be equal, it is possible to compute the fuel consumed per mile from the total carbon emitted per mile. These results, expressed reciprocally as miles per gallon, are tabulated as harmonic means and harmonic standard deviations under the heading "Fuel Economy" in the appropriate tables. The rationale for the use of harmonic means and standard deviations resides in the fact that it is the fuel consumed over a fixed distance that is the random variable, not the distance covered on a fixed amount of fuel (see Reference 5).

The data shown in Tables 13 and 27 indicate that through model year 1973 there are no significant differences among the fuel economies exhibited by the different model years in the study if the fuel economy for each model year is obtained by averaging over all inertia weight groups. These results are observed by noting the bottom rows of the two tables. The tendency toward constant fuel economy may reflect the fact that any deleterious effect of emission controls on fuel economy is compensated for by the sales trend toward lighter vehicles. However, discretion must be applied when interpreting the individual row or inertia weight groups due to the small number of vehicles tested for a specific year and vehicle inertia weight. When interpreting data for individual model years, represented by column data in the above mentioned tables, it is evident that fuel economy decreases (fuel consumption increases) rather consistently with increasing inertia weight.

Tables 14, 15 and 16 display fuel economy by model year for the 1972 FTP, the 1975 FTP and the cold transient, hot transient and cold stabilized portions of the Federal Test Procedure. The fuel economies tabulated represent a sales-weighted selection of vehicles for each model year, and it must be borne in mind that the distribution of inertia weights changes from model year to model year. In particular, light-weight vehicles constitute a larger

fraction of the sales of 1973 and 1974 model year vehicles than in the sales of previous model year vehicles. Consequently, the effect of emission control systems on fuel economy is confounded with the effect of changing distributions of inertia weight from one model year to another.

3.2.4 Performance of Vehicles In Their First Year of Operation

Of major importance when comparing different Fiscal Year programs is whether new model-year vehicles tested in their program Fiscal Year had lower levels of emissions in their first year of operation than previous model-year vehicles tested in their program Fiscal Year had in their first year of operation. The arithmetic mean emission levels for vehicles tested in their first year of operation for the 1971, 1972 and 1973 FY programs are presented in Table 20.

Results indicate that for Denver, where HC and CO emission levels are usually higher than in other low altitude cities, HC emissions have been reduced 11% from FY 72 to FY 73 and 29% from FY 71 to FY 73. CO emissions for Denver have increased slightly from new vehicles tested in FY 72 to new vehicles tested in FY 73, probably as a result of the newly imposed NOX standard. CO emissions, however, have decreased 7% from new vehicles tested in FY 71 as compared to new vehicles tested in FY 73. NOX emissions for Denver have decreased 40% from 1971 vehicles tested in FY 71 as compared to 1973 vehicles tested in FY 73.

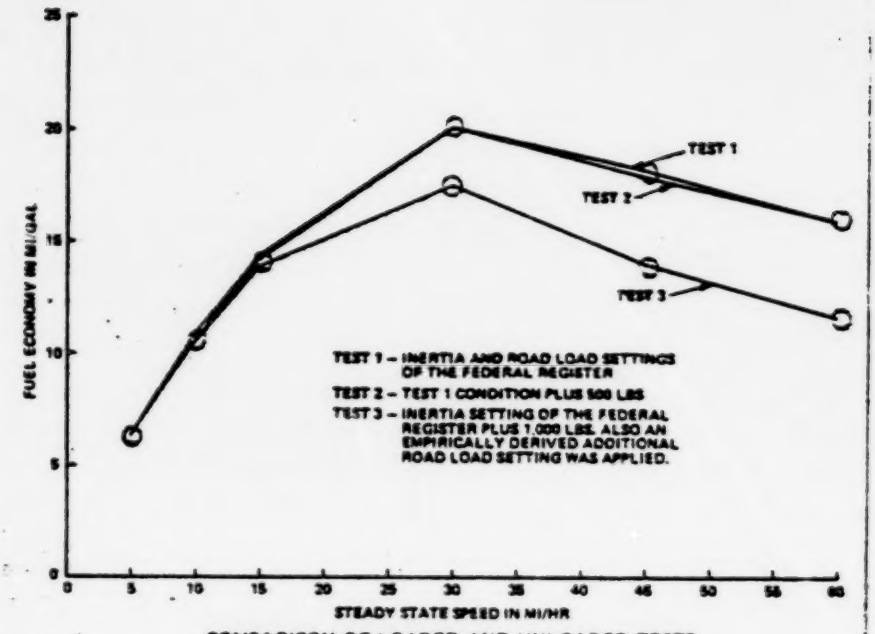
Results for Los Angeles indicate an increase in HC emissions of 6% from FY 72 to FY 73 and 20% from FY 71 to FY 73. CO emissions for Los Angeles have decreased by 15% from FY 72 to FY 73 and by 8% from FY 71 to FY 73. Results for NOX emissions have decreased by 24% from FY 72 to FY 73 and also by 24% from FY 71 to FY 73.

For the four combined cities, HC and CO emissions increased 17% and 19% respectively when new 1973 model year vehicles were compared with new 1972 model year vehicles, a result probably due to the imposition of the 1973 NOX standard for all states. It is significant to note that NOX values decreased 26% for the four combined cities when comparing 1973 vehicles tested in FY 73 with 1972 vehicles tested in FY 72. Whereas the imposition of the NOX standard has produced significant decreases in NOX, it has, as already stated, contributed to the increase in HC and/or CO emissions. In-use 1973 vehicles have mean emission levels for HC that are 19% above the Federal standard of 3.4 gm/mi, mean emissions for CO that are 30% above the Federal standard of 39.0 gm/mi and mean emissions for NOX that are 14% above the Federal standard of 3.0 gm/mi for the four combined cities.

3.2.5 Loaded Vehicles and Vehicles Towing Trailers

Results for both emissions and fuel economy for 42 vehicles tested in Detroit under three load conditions are presented in Table 57. Test 1 represents the inertia weight and road load settings as specified in the Federal Register. Test 2 represents a condition in which the road load setting of the Federal Register is unchanged but the inertia weight is increased 500 pounds to simulate the addition of passengers and luggage. Test 3 represents a condition intended to simulate the towing of a trailer. In this test the inertia weight is increased by 1000 pounds over that specified in the Federal Register, and the road load power setting is increased by an amount empirically determined from road test. It is evident from the table that increased loading of a vehicle results in greater fuel consumption (reduced fuel economy) and higher emission levels. Note, however, that the effect is minimal for loads within the normal operating load range of the vehicle as a free-standing conveyance without a trailer.

The effect of loading on fuel economy for the same vehicle is shown graphically in the figure. It is evident that for vehicles towing trailers the decrease in fuel economy is quite significant. Moreover, the greater the speed, the larger the difference in fuel economy between vehicles without trailers and vehicles with trailers. Of the speeds tested, the best fuel economy for all three load conditions appears at about 30 miles per hour.


FUEL ECONOMY IN MI/GAL
STEADY STATE SPEED IN MI/HR
TEST 1
TEST 2
TEST 3
TEST 1 – INERTIA AND ROAD LOAD SETTINGS OF THE FEDERAL REGISTER
TEST 2 – TEST 1 CONDITION PLUS 500 LBS
TEST 3 – INERTIA SETTING OF THE FEDERAL REGISTER PLUS 1,000 LBS. ALSO AN EMPIRICALLY DERIVED ADDITIONAL ROAD LOAD SETTING WAS APPLIED.

COMPARISON OF LOADED AND UNLOADED TESTS ON FORTY-TWO 1967-1973 MODEL YEAR VEHICLES

The fact that both fuel consumption and emission levels tend to increase with load in these tests should not be construed as indicating that a vehicle of light-weight design will necessarily have lower emissions than a vehicle of heavy design (see Tables 13 and 27). In this case, differences in weight are at least to some extent offset by the fact that power plants and transmission are adjusted to vehicle weight.

3.2.6 Air Conditioned Vehicles

Results on the effect of air conditioning on emissions and on fuel economy are reported in Table 56. Note that the table includes tests with the actual air conditioning system operating as well as tests in which air conditioning is simulated. Simulation is in accordance with the Federal

Register for certification testing and consists of an additional 10% road load horsepower.

As indicated by comparison of results with the actual air conditioning system on and off, emissions are appreciably higher and fuel economy appreciably lower when the air conditioning system is in operation. In the case of simulated air conditioning a similar but less evident trend is noted, but statistical tests of significance show that emissions are generally lower for vehicles when tested with simulated air conditioning than when tested with the actual factory-installed air conditioning system operating.

3.2.7 Replicate Testing

A question of interest in connection with emission testing is the degree to which emission measurements are repeatable when a test is performed two or more times on the same vehicle and under the same conditions. In connection with the FY 73 emission factors program, twenty Denver vehicles and twenty Los Angeles vehicles were subjected to duplicate tests to afford information on repeatability.

Results of these replicate tests have been analyzed in two ways. First, a test of significance was performed to determine if there were any systematic difference between the first and second replicate measurements. This test revealed no bias. Second, the mean and standard deviation for each pair of values was computed, and the standard deviation for each pair of values was expressed as a percent of the mean for those two values. The resulting coefficients of variation were then averaged for the twenty vehicles. The variances for the twenty vehicles were averaged and the square root of this average was obtained as an estimate of the pooled standard deviation for each pollutant.

The results of these analyses are based on the 1972 FTP and are summarized below.

	Pooled Standard Deviation (gms/mi)	Average Coefficient of Variation (%)
	Denver Vehicles	
HC	0.39	5.8
CO	7.3	6.9
NOX	0.14	5.5
CO_2	23.1	2.1
	Los Angeles Vehicles	
HC	.81 (.34)	12.3 (5.5)
CO	14.5 (7.0)	13.4 (6.6)
NOX	.52 (.19)	20.1 (6.7)
CO_2	24.7 (17.7)	2.7 (2.0)

According to these results, the standard deviation of replicate measurements for the 20 Denver vehicles is approximately 6% to 7% of the average emission levels for HC, CO and NOX. In the case of Los Angeles, two sets of values are tabulated. The first set represents calculations performed on all twenty vehicles. The second set, in parentheses, represents calculations performed after rejecting two vehicles regarded as outliers on the basis of extremely large and unrepresentative differences between replicate determinations. After removal of these outliers from the data, the Los Angeles vehicles exhibit repeatability comparable to that of the Denver vehicles. The half-width of a 95% confidence interval for the mean, if based on a single emission test, is approximately double the standard deviation tabulated for a particular pollutant.

REFERENCES

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2. A Study of Emissions from 1967-1974 Light Duty Vehicles in Los Angels and St. Louis, EPA Report EPA-460/3-74-016

3. A Study of Emissions from 1967-1974 Light Duty Vehicles in Newark, New Jersey, EPA Report EPA-460/3-74-014

4. Automobile Exhaust Emission Surveillance - A Summary, EPA Report APTD-1544

5. Automobile Exhaust Emission Surveillance - Analysis of the FY 72 Program, EPA Report EPA-460/2-74-001

Table 1
FY73 EMISSION FACTOR PROGRAM

COMPOSITE EMISSION LEVELS FOR ALL CITIES EXCLUDING DENVER AND LOS ANGELES

COLD TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	68	68.1	34.07	23.99	25.00	1.81	489.78	253.11	413.42	1.68	1[illegible].01	7.14	[illegible].05	1.82
1968	72	61.00	34.86	35.06	20.87	1.71	365.13	240.65	327.11	1.74	19.[illegible]8	9.[illegible]4	[illegible].1[illegible]	1.74
1969	84	57.81	29.91	24.18	25.[illegible]	1.69	352.14	210.[illegible]	4[illegible].[illegible]5	1.61	21.16	[illegible].[illegible]3	19.[illegible]1	1.58
1970	88	51.46	27.[illegible]4	19.67	23.75	1.[illegible]5	3[illegible].67	170.54	303.07	1.69	19.25	3.[illegible]2	17.[illegible]2	1.74
1971	1108	37.46	21.48	17.13	18.82	1.69	2[illegible].3[illegible]	1[illegible].09	22[illegible].53	1.74	19.[illegible]4	7.[illegible]1	18.19	[illegible].[illegible]3
1972	1120	28.71	20.61	17.25	17.[illegible]4	1.68	2[illegible].[illegible]4	1[illegible].[illegible]3	2[illegible].63	1.79	[illegible].[illegible]8	7.[illegible]4	18.77	1.[illegible]1
1973	1140	18.11	17.76	11.61	18.[illegible]4	1.69	210.08	110.7[illegible]	1[illegible].[illegible]3	1.[illegible]1	15.[illegible]2	[illegible].7[illegible]	13.[illegible]7	1.[illegible]
1974	40	5.81	1[illegible].[illegible]7	[illegible].71	13.[illegible]9	1.57	170.[illegible]2	7[illegible].7[illegible]	15[illegible].[illegible]9	1.56	12.[illegible]4	5.[illegible]2	11.52	1.[illegible]
TOTAL	720	39.81	24.72	21.[illegible]6	20.[illegible]3	1.71	3[illegible].[illegible]4	2[illegible].[illegible]8	[illegible]3.[illegible]4	1.82	18.49	7.99	16.[illegible]3	1.[illegible]

Table 2
FY73 EMISSION FACTOR PROGRAM

COMPOSITE EMISSION LEVELS FOR ALL CITIES EXCLUDING DENVER AND LOS ANGELES

COLD STABILIZED

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	68	68.1	33.[illegible]4	24.[illegible]8	26.[illegible]9	1.87	[illegible]3[illegible].3[illegible]	23[illegible].1[illegible]	3[illegible]6.[illegible]3	1.[illegible]	1[illegible].17	[illegible].88	11.[illegible]1	1.8[illegible]
1968	72	61.01	28.[illegible]8	30.[illegible]1	24.[illegible]1	1.[illegible]	3[illegible].[illegible]4	1[illegible].[illegible]2	23[illegible].[illegible]3	1.67	17.78	[illegible].7[illegible]	15.[illegible]7	1.75
1969	84	57.81	23.81	2[illegible].11	13.[illegible]3	1.73	[illegible].[illegible]1	13[illegible].11	[illegible]1[illegible].[illegible]1	1.89	1[illegible].[illegible]8	[illegible].13	17.[illegible]7	1.[illegible]
1970	88	51.46	17.70	12.35	13.[illegible]2	1.[illegible]	25[illegible].31	13[illegible].[illegible]6	21[illegible].[illegible]6	1.[illegible]	1[illegible].[illegible]6	7.[illegible]8	1[illegible].[illegible]4	1.[illegible]
1971	1106	37.46	1[illegible].92	[illegible].7[illegible]	13.[illegible]7	1.59	2[illegible].[illegible]5	1[illegible].[illegible]3	1[illegible].[illegible]3	2.[illegible]1	13.52	7.[illegible]3	12.[illegible]2	1.[illegible]
1972	1120	28.71	15.15	13.57	12.[illegible]4	1.7[illegible]	22[illegible].5[illegible]	1[illegible].[illegible]1	1[illegible]2.[illegible]8	2.[illegible]	15.38	7.[illegible]1	13.[illegible]4	1.[illegible]
1973	1140	18.11	1[illegible].[illegible]4	[illegible].[illegible]8	11.[illegible]1	1.[illegible]	19[illegible].[illegible]4	1[illegible].[illegible]7	1[illegible]3.[illegible]3	2.18	11.[illegible]4	[illegible].[illegible]3	9.[illegible]2	1.[illegible]
1974	40	5.81	1[illegible].73	[illegible].7[illegible]	9.87	1.51	137.7[illegible]	1[illegible].19	9[illegible].[illegible]2	2.[illegible]	[illegible].[illegible]9	[illegible].[illegible]3	8.[illegible]7	[illegible].[illegible]4
TOTAL	720	39.[illegible]	18.[illegible]6	19.[illegible]1	15.[illegible]8	1.77	2[illegible]3.73	17[illegible].98	18[illegible].[illegible]7	2.21	14.7[illegible]	7.[illegible]1	12.[illegible]5	1.71

Table 3
FY73 EMISSION FACTOR PROGRAM

COMPOSITE EMISSION LEVELS FOR ALL CITIES EXCLUDING DENVER AND LOS ANGELES

HOT TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	68	68.1	25.[illegible]0	14.81	22.[illegible]1	1.58	301.4[illegible]	181.55	[illegible]57.33	1.[illegible]	17.49	7.[illegible]2	15.37	1.76
1968	72	61.01	21.31	2[illegible].75	17.17	1.68	187.7[illegible]	143.07	159.92	1.85	22.69	9.[illegible]8	2[illegible].38	1.[illegible]
1969	84	57.81	19.88	18.[illegible]	15.16	1.7[illegible]	166.91	10[illegible].5[illegible]	1[illegible].[illegible]0	1.88	2[illegible].[illegible]8	9.[illegible]1	[illegible]2.13	1.3[illegible]
1970	88	51.46	14.98	10.[illegible]9	13.[illegible]0	1.[illegible]	151.[illegible]0	79.68	135.[illegible]9	1.[illegible]	21.[illegible]4	[illegible].77	19.73	1.[illegible]
1971	1108	37.46	13.[illegible]9	9.[illegible]	11.[illegible]3	1.[illegible]	126.[illegible]2	90.19	103.91	1.[illegible]	[illegible].1.57	9.[illegible]1	19.[illegible]4	1.[illegible]
1972	1120	28.71	13.15	11.[illegible]	11.[illegible]0	1.[illegible]	151.21	131.1[illegible]	112.[illegible]5	[illegible].1[illegible]	2[illegible].83	9.[illegible]4	[illegible]8.[illegible]6	1.[illegible]
1973	1140	18.11	11.[illegible]2	[illegible].[illegible]4	1[illegible].[illegible]4	1.[illegible]	125.[illegible]6	9[illegible].13	101.[illegible]8	1.91	15.31	7.[illegible]1	[illegible]3.94	1.[illegible]
1974	40	5.81	1[illegible].[illegible]8	3.[illegible]	9.91	1.[illegible]	102.8[illegible]	[illegible]3.16	9[illegible].33	1.[illegible]	12.[illegible]	5.1[illegible]	11.73	1.[illegible]
TOTAL	720	39.81	15.52	1[illegible].[illegible]7	13.13	1.8[illegible]	159.65	1[illegible]8.20	129.[illegible]	2.[illegible]	19.75	9.1[illegible]	17.[illegible]4	1.[illegible]

NOX CORRECTED FOR HUMIDITY

Table 4
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DENVER

COLD TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	66.4	45.95	20.27	42.87	1.44	626.41	243.63	579.53	1.53	9.21	5.22	8.66	1.74
1968	18	63.5	34.08	13.42	31.85	1.45	430.87	176.61	394.76	1.57	12.62	4.70	11.78	1.48
1969	21	54.7	34.18	12.59	31.91	1.50	471.61	193.37	425.04	1.67	14.54	6.56	13.06	1.62
1970	22	45.7	34.50	14.61	31.58	1.55	512.90	180.46	477.01	1.51	12.16	6.04	10.84	1.66
1971	27	32.7	27.11	9.38	25.58	1.42	454.00	139.79	430.82	1.41	12.52	5.60	11.67	1.46
1972	30	27.5	25.15	8.39	23.77	1.42	407.92	179.09	369.10	1.61	14.12	6.07	12.95	1.53
1973	35	14.3	22.17	7.89	20.88	1.42	395.81	161.38	361.53	1.57	8.70	4.54	7.66	1.69
1974	10	5.3	19.25	2.54	19.13	1.14	393.68	96.91	383.41	1.29	8.63	2.49	7.68	1.37
TOTAL	180	37.1	29.59	13.67	27.01	1.53	452.65	185.97	412.92	1.57	11.68	5.72	10.36	1.66

Table 5
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DENVER

COLD STABILIZED

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	66.4	36.66	12.46	34.88	1.38	550.66	173.90	522.84	1.41	7.73	5.22	6.29	2.60
1968	18	63.5	28.98	13.60	26.43	1.54	369.81	148.15	337.67	1.59	10.99	5.77	9.48	1.80
1969	21	54.7	25.64	8.27	24.31	1.41	394.76	148.29	364.25	1.54	13.00	5.76	11.74	1.62
1970	22	45.7	21.95	7.24	20.87	1.38	368.89	114.62	350.96	1.39	11.41	5.99	10.20	1.63
1971	27	32.7	19.11	6.05	18.28	1.35	345.93	87.64	334.81	1.31	10.68	4.25	10.00	1.43
1972	30	27.5	19.25	7.96	17.87	1.47	330.74	241.33	275.40	1.81	10.64	5.69	9.32	1.69
1973	35	14.3	15.56	7.94	14.33	1.58	304.22	175.00	254.13	1.90	6.25	2.62	5.72	1.55
1974	10	5.3	14.30	2.42	14.11	1.19	271.59	47.38	267.85	1.19	5.74	2.83	5.27	1.52
TOTAL	180	37.1	21.93	10.67	19.76	1.58	361.38	173.45	321.65	1.66	9.65	5.36	8.32	1.75

Table 6
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DENVER

HOT TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	66.4	30.93	9.77	29.53	1.37	484.08	148.91	456.61	1.45	8.67	4.94	7.58	1.71
1968	18	63.5	24.06	12.01	21.90	1.53	302.53	127.03	280.42	1.48	13.40	5.74	12.23	1.57
1969	21	54.7	22.27	7.52	21.06	1.42	328.17	141.04	299.25	1.57	15.69	6.96	14.14	1.62
1970	22	45.7	21.83	6.57	20.94	1.34	349.84	126.21	329.53	1.42	13.22	6.46	11.93	1.59
1971	27	32.7	18.46	5.76	17.68	1.35	325.70	91.32	311.57	1.37	13.63	6.11	12.82	1.47
1972	30	27.5	18.30	6.75	17.22	1.43	303.28	178.82	265.75	1.68	13.99	6.43	12.83	1.66
1973	35	14.3	15.77	6.14	14.56	1.53	282.19	152.14	242.00	1.86	8.23	3.66	7.46	1.56
1974	10	5.3	15.51	2.26	15.36	1.16	295.98	104.11	280.00	1.42	7.63	4.36	6.79	1.63
TOTAL	180	37.1	20.34	8.52	18.79	1.49	327.72	148.14	295.29	1.61	12.01	6.28	10.53	1.69

NOX CORRECTED FOR HUMIDITY

Table 7
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR LOS ANGELES

COLD TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	62.1	31.65	54.03	19.99	2.16	347.23	314.37	254.64	2.29	12.54	6.12	10.46	2.14
1968	18	63.5	26.38	16.11	22.83	1.66	333.80	259.03	280.68	1.76	16.02	6.96	13.88	2.07
1969	21	65.0	26.28	17.27	22.69	1.68	346.77	257.93	269.26	2.20	15.09	6.62	13.62	1.67
1970	22	51.0	35.88	59.88	23.61	2.09	338.54	343.38	266.84	1.86	15.07	6.49	12.74	2.18
1971	27	47.5	18.01	8.34	16.28	1.59	275.29	202.68	216.88	2.05	14.07	4.98	13.18	1.46
1972	30	32.9	18.38	10.26	16.25	1.63	203.92	90.89	187.93	1.49	16.82	4.23	16.36	1.26
1973	35	21.5	18.16	15.91	15.13	1.71	208.60	136.08	183.66	1.61	13.17	5.24	12.15	1.52
1974	10	11.3	14.32	3.94	13.69	1.28	181.58	89.10	167.89	1.48	9.71	4.80	8.95	1.49
TOTAL	180	43.5	23.14	29.39	18.19	1.78	273.94	227.58	221.44	1.87	14.40	5.75	12.92	1.72

Table 8
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR LOS ANGELES

COLD STABILIZED

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	62.1	25.21	33.19	16.57	2.30	305.74	277.86	182.61	3.18	9.68	5.57	7.35	2.66
1968	18	63.5	26.48	24.59	20.60	1.98	305.47	334.91	202.13	2.54	12.43	7.17	9.47	2.61
1969	21	65.0	19.92	11.30	16.12	1.69	274.34	135.44	233.62	2.02	11.38	5.23	10.29	1.60
1970	22	51.0	22.68	22.83	18.01	1.85	248.97	159.98	199.93	2.09	11.25	5.53	9.93	1.70
1971	27	47.5	14.87	11.43	12.19	1.86	199.82	211.36	134.31	2.53	9.39	3.76	8.72	1.48
1972	30	32.9	12.24	9.43	9.83	1.93	162.46	87.62	139.54	1.78	10.44	3.83	9.85	1.41
1973	35	21.5	13.88	18.25	10.03	1.98	150.87	163.31	99.36	2.41	9.35	3.87	8.58	1.54
1974	10	11.3	10.12	2.61	9.81	1.30	124.59	99.63	94.58	2.19	6.99	4.13	6.34	1.52
TOTAL	180	43.5	17.68	18.91	13.33	1.99	215.16	199.55	150.12	2.41	10.16	4.92	8.96	1.72

Table 9
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR LOS ANGELES

HOT TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	62.1	16.07	23.60	13.14	1.96	182.56	163.61	116.60	2.82	13.62	7.34	11.40	1.97
1968	18	63.5	17.71	7.63	16.10	1.39	167.68	124.89	127.78	2.20	17.02	7.07	15.48	1.61
1969	21	65.0	15.22	6.78	14.12	1.46	167.91	118.77	138.64	1.89	16.11	5.77	14.84	1.57
1970	22	51.0	16.36	18.04	14.54	1.82	162.45	196.65	120.72	1.97	16.15	7.03	14.21	1.86
1971	27	47.5	11.02	5.10	10.05	1.54	115.57	115.24	86.36	2.10	14.66	5.15	13.81	1.43
1972	30	32.9	11.46	6.29	10.17	1.64	105.18	44.25	96.42	1.53	16.52	4.14	16.06	1.27
1973	35	21.5	12.65	12.64	10.42	1.70	96.26	63.96	81.05	1.78	13.65	5.30	12.69	1.48
1974	10	11.3	8.80	2.65	8.56	1.29	87.83	46.97	78.63	1.62	8.86	5.41	7.96	1.52
TOTAL	180	43.5	14.01	12.21	11.76	1.69	131.92	119.49	101.80	2.00	14.94	6.03	13.58	1.80

NOX CORRECTED FOR HUMIDITY

Table 10
FY73 EMISSION FACTOR PROGRAM

COMPOSITE EMISSION LEVELS FOR ALL CITIES EXCLUDING DENVER AND LOS ANGELES

1972 FTP

YEAR	N	MEAN MILES (A)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
1967	68	60.1	0	2	35	9.75	6.63	8.60	1.37	181.6	90.7	167.7	1.60	3.67	1.61	3.49	1.75
1968	72	61.0	4	6	16	7.97	4.33	6.95	1.7	147.7	82.6	127.6	1.77	4.07	1.21	4.01	1.68
1969	64	57.8	2	11	8	7.14	4.11	5.94	1.66	131.2	71.5	111.9	1.74	4.14	1.14	4.02	1.53
1970	66	51.4	6	7	13	6.62	3.73	5.63	1.71	124.1	72.6	104.1	1.77	4.19	1.23	4.03	1.64
1971	138	37.4	25	23	22	4.85	2.89	4.39	1.92	81.7	55.4	63.8	1.74	4.47	1.89	4.31	1.51
1972	126	28.7	34	28	15	4.09	2.27	3.63	1.87	63.5	43.7	51.6	1.77	4.75	1.98	4.65	1.95
1973	144	18.1	41	37	21	4.37	2.16	3.75	1.96	54.4	33.6	43.9	1.74	3.47	1.86	3.46	1.54
1974	48	5.8	57	62	65	3.44	1.93	3.14	1.51	41.1	24.7	34.4	1.71	4.28	1.11	4.07	1.44
TOTAL	723	39.8	21	22	23	5.78	3.16	4.85	1.89	72.3	46.3	61.3	1.83	4.41	1.44	4.19	1.82

NOX CORRECTED FOR HUMIDITY

* HC 3.4 GM/MI
CO 39.0 GM/MI
NOX 3.0 GM/MI

Table 11
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DENVER

1974 FTP

YEAR	N	MEAN MILES (A)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
1967	17	60.4	0	0	92	11.02	3.58	10.53	1.35	154.94	47.02	149.06	1.43	2.48	1.33	2.19	1.76
1968	18	63.5	0	5	56	8.41	3.31	7.88	1.45	136.76	36.57	130.28	1.44	3.13	1.28	2.94	1.54
1969	21	54.7	0	0	47	7.98	2.59	7.56	1.40	119.52	41.81	108.91	1.52	3.87	1.81	3.33	1.38
1970	22	45.7	0	0	59	7.53	2.70	7.05	1.48	117.57	35.52	111.75	1.41	3.14	1.48	2.88	1.36
1971	27	32.7	3	0	51	5.16	1.74	5.92	1.34	106.86	25.17	103.04	1.32	3.09	1.15	2.92	1.39
1972	30	27.5	10	0	40	5.92	2.03	5.59	1.42	98.09	32.11	88.06	1.61	3.30	1.51	3.10	1.37
1973	35	14.3	20	8	88	5.03	1.95	4.70	1.48	93.34	41.92	83.53	1.69	1.99	0.93	1.86	1.61
1974	10	5.3	0	0	90	4.47	0.55	4.44	1.13	43.37	14.84	32.46	1.18	1.84	0.71	1.76	1.39
TOTAL	180	37.1	7	3	63	6.87	2.99	6.30	1.52	106.54	43.35	99.72	1.54	2.84	1.41	2.93	1.84

NOX CORRECTED FOR HUMIDITY

* HC 3.4 GM/MI
CO 39.0 GM/MI
NOX 3.0 GM/MI

Table 12
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR LOS ANGELES

1974 FTP

YEAR	N	MEAN MILES (A)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
1967	17	62.1	29	29	58	7.36	11.48	5.00	2.10	87.06	72.20	60.83	2.37	2.68	1.91	2.44	1.96
1968	18	63.5	16	27	27	7.01	5.36	5.84	1.84	85.24	76.28	66.30	1.99	3.79	1.85	3.12	1.21
1969	21	65.0	9	9	33	6.16	3.48	5.32	1.38	82.81	49.92	69.32	1.99	3.93	1.41	3.63	1.37
1970	22	51.0	14	13	36	7.03	9.90	5.60	1.98	76.33	31.81	65.41	1.78	3.31	1.48	3.13	1.72
1971	27	47.5	40	33	59	4.38	2.50	3.85	1.67	63.35	30.82	49.51	2.06	3.13	1.31	2.98	1.37
1972	30	32.4	50	43	30	4.8	2.30	3.59	1.67	48.89	22.36	44.34	1.56	3.63	1.97	3.32	1.28
1973	35	21.5	57	60	57	4.27	4.49	3.40	1.78	47.93	38.41	39.26	1.81	3.11	1.15	2.78	1.11
1974	10	11.3	70	50	90	3.26	0.77	3.18	1.26	44.42	19.33	38.64	1.62	2.23	1.16	2.15	1.49
TOTAL	180	43.5	37	35	46	5.44	5.45	4.29	1.82	69.21	52.94	51.82	1.96	3.27	1.34	2.97	1.84

NOX CORRECTED FOR HUMIDITY

* HC 3.4 GM/MI
CO 39.0 GM/MI
NOX 3.0 GM/MI

Table 13

FY83 EMISSION FACTOR PROGRAM

1972 FTP RESULTS BY INERTIA WEIGHT FOR

ALL CITIES, EXCLUDING DENVER AND LOS ANGELES

EMISSIONS IN GM/MI -FUEL ECONOMY IN MI/GAL

INERTIA WT. (LBS)	1967		1968		1969		1970		1971		1972		1973		1974		TOTAL	
	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
<=2000	N= 5		N= 7		N= 3		N= 6		N= 7		N= 6		N= 4		N= 1		N= 47	
HC	6.55	6.82	8.55	3.26	9.15	7.66	4.87	2.66	5.21	3.26	6.8	6.6	3.52	1.35	3.98	0.0	5.72	3.42
CO	74.66	5.55	93.50	59.66	79.65	46.53	46.24	16.46	37.65	13.43	6.6	6.6	39.26	22.81	28.71	0.6	51.35	29.62
NOX	3.39	2.23	2.96	0.91	2.37	1.41	3.76	1.76	3.66	1.96	6.8	6.6	4.58	6.86	4.59	0.0	3.21	1.62
FUEL ECONOMY	20.93	3.48	19.37	3.86	21.60	1.93	22.67	3.65	22.41	4.16	6.6	6.6	22.66	3.72	20.68	0.6	21.31	3.66
2001-2500	N= 4		N= 7		N= 1		N= 4		N= 13		N= 36		N= 19		N= 3		N= 78	
HC	6.8	6.6	4.74	2.16	6.36	6.6	3.67	6.31	5.37	5.56	3.79	1.82	4.87	2.75	4.19	2.49	4.24	3.65
CO	6.6	6.6	62.62	15.63	54.86	6.6	52.67	7.66	45.46	18.66	52.53	26.93	47.72	19.69	39.66	13.19	49.66	23.21
NOX	6.8	6.8	2.39	6.58	5.46	6.6	3.82	6.27	3.53	1.65	3.66	1.46	3.46	1.16	2.96	6.53	3.63	1.59
FUEL ECONOMY	6.6	6.6	23.28	6.66	17.30	6.6	17.56	1.26	19.97	2.34	16.61	3.65	18.19	2.81	22.67	1.96	18.64	2.99
2501-3000	N= 8		N= 9		N= 11		N= 8		N= 9		N= 9		N= 24		N= 1		N= 79	
HC	16.92	6.56	5.37	2.16	6.73	1.66	6.37	1.76	3.96	1.33	3.18	1.62	4.32	2.09	3.27	6.6	5.03	3.26
CO	113.36	55.36	67.61	36.12	68.59	26.61	60.52	53.61	55.69	16.96	49.19	23.16	59.55	35.02	19.27	6.6	67.16	36.62
NOX	6.67	1.67	5.56	3.26	5.72	1.91	6.56	2.76	5.36	2.26	6.63	1.55	3.66	1.43	2.56	6.6	4.57	2.26
FUEL ECONOMY	13.59	1.71	15.69	2.35	16.52	1.63	16.96	3.51	15.35	3.26	15.13	3.11	16.67	3.63	13.58	6.6	16.73	2.65
3001-3500	N= 16		N= 23		N= 22		N= 16		N= 24		N= 15		N= 14		N= 6		N= 126	
HC	6.19	6.26	6.21	2.63	6.25	6.17	6.16	1.62	5.17	2.63	6.16	1.26	6.66	1.98	3.66	1.36	5.73	3.63
CO	165.63	69.35	76.13	36.92	6.19	61.69	56.33	23.99	66.69	32.13	52.26	26.72	68.76	35.66	56.26	30.36	66.61	61.23
NOX	6.35	2.15	5.62	2.36	5.56	1.71	6.26	1.72	6.36	1.31	6.26	1.66	2.62	1.61	2.66	6.67	6.52	1.67
FUEL ECONOMY	12.61	2.56	12.62	1.52	13.66	1.79	13.35	1.32	12.12	1.13	11.73	1.66	12.16	1.69	12.36	3.66	12.66	1.73
3501-4000	N= 36		N= 21		N= 27		N= 32		N= 23		N= 26		N= 35		N= 15		N= 207	
HC	9.66	2.96	11.26	15.55	6.51	7.65	7.61	5.66	6.66	1.33	5.66	6.64	3.79	1.56	3.67	1.66	6.67	6.96
CO	129.93	66.69	116.22	76.19	69.62	62.92	64.23	26.66	67.76	33.56	62.11	55.96	52.66	36.56	36.96	23.66	65.71	56.26
NOX	3.99	1.77	6.16	1.76	6.67	1.61	6.63	1.72	5.66	1.61	6.62	1.66	2.67	1.15	2.61	1.25	6.16	1.79
FUEL ECONOMY	11.26	1.75	11.63	2.67	12.31	1.96	11.56	1.66	11.13	1.32	10.79	1.55	11.25	1.56	10.35	6.66	11.36	1.65
4001-4500	N= 5		N= 11		N= 10		N= 26		N= 21		N= 32		N= 25		N= 11		N= 142	
HC	6.11	3.62	6.76	2.76	7.56	7.66	5.26	1.76	5.66	2.65	5.76	6.91	6.16	2.76	3.62	1.69	5.56	6.66
CO	123.76	66.22	112.27	69.21	92.16	69.66	91.73	66.06	73.61	36.79	71.65	66.66	57.59	65.11	69.86	25.21	76.91	66.63
NOX	3.66	1.56	5.66	2.82	6.66	2.76	5.66	1.86	5.11	2.61	5.86	2.13	3.96	2.29	3.66	1.56	6.66	2.32
FUEL ECONOMY	16.62	1.96	16.61	1.63	16.66	1.16	16.16	1.16	16.66	1.56	16.12	1.36	16.21	1.66	9.53	6.61	16.25	1.26
4501-5000	N= 6		N= 6		N= 6		N= 2		N= 11		N= 12		N= 16		N= 3		N= 52	
HC	16.26	19.36	11.16	16.36	5.66	1.65	7.62	1.56	6.15	3.66	3.52	1.66	6.35	1.62	2.66	6.36	5.75	7.69
CO	159.76	25.86	56.35	21.16	97.59	9.97	95.71	16.56	6.66	52.66	67.66	66.66	55.66	21.62	22.16	6.61	66.36	63.23
NOX	3.76	6.61	6.33	2.11	6.66	6.66	6.65	6.69	6.96	2.21	6.26	2.13	6.36	2.65	6.66	6.36	6.16	2.69
FUEL ECONOMY	9.16	1.65	12.66	1.16	9.66	6.66	9.71	6.96	9.23	1.56	16.13	1.67	9.63	1.66	9.66	6.76	9.66	1.16
5000	N= 6		N= 6		N= 6		N= 6		N= 6		N= 2		N= 5		N= 6		N= 7	
HC	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.67	3.56	3.51	6.63	6.6	6.6	6.26	1.93
CO	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	163.66	157.75	66.66	6.36	6.6	6.6	66.76	92.66
NOX	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	3.66	2.76	3.63	6.59	6.6	6.6	3.63	1.25
FUEL ECONOMY	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	8.66	2.66	6.77	6.66	6.6	6.6	6.86	6.97
TOTAL	N= 66		N= 72		N= 85		N= 66		N= 166		N= 126		N= 146		N= 46		N= 726	
HC	9.75	6.63	3.97	9.32	7.16	6.61	6.62	3.72	6.65	2.69	6.69	6.22	6.67	2.66	3.62	1.65	5.78	5.16
CO	121.66	56.71	69.76	52.16	61.62	61.55	79.66	36.63	61.69	35.56	65.55	66.17	53.66	33.62	61.63	26.76	72.56	66.36
NOX	3.97	1.61	6.97	2.62	6.36	6.66	6.69	6.65	6.67	1.69	6.65	1.56	3.67	1.62	2.66	1.11	6.61	2.66
FUEL ECONOMY	11.62	2.56	12.23	2.75	12.53	2.66	11.61	6.96	11.31	3.26	10.69	3.16	11.61	3.61	11.96	6.91	11.67	2.69

Table 14
FY73 EMISSION FACTOR PROGRAM

FUEL ECONOMY IN MILES PER GALLON

COMPOSITE EMISSION LEVELS FOR ALL CITIES EXCLUDING DENVER AND LOS ANGELES

YEAR	N	COLD TRANSIENT		COLD STABILIZED		HOT TRANSIENT		1972 FTP		1975 FTP	
		MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	68	11.41	2.58	12.43	2.74	13.43	2.97	11.91	2.58	12.57	2.67
1968	72	11.58	2.95	12.96	2.94	14.02	3.03	12.28	2.74	12.95	2.89
1969	84	11.96	2.85	13.11	2.85	14.83	2.87	12.93	2.88	13.22	2.87
1970	86	11.59	2.65	12.93	2.85	14.25	3.04	12.54	2.84	12.97	2.84
1971	106	11.94	3.36	12.81	3.41	14.47	3.62	12.81	3.54	12.95	3.43
1972	126	11.73	3.14	12.34	3.31	14.14	3.75	12.49	3.15	12.80	3.34
1973	144	11.77	3.16	12.25	3.19	14.11	3.86	12.51	3.27	12.85	3.21
1974	90	11.87	2.93	11.93	2.93	13.86	3.74	11.96	2.91	11.39	2.96
TOTAL	723	11.69	2.91	12.44	3.00	14.15	3.37	12.07	2.89	12.69	3.01

Table 15
FY73 EMISSION FACTOR PROGRAM

FUEL ECONOMY IN MILES PER GALLON

DENVER

YEAR	N	COLD TRANSIENT		COLD STABILIZED		HOT TRANSIENT		1972 FTP		1975 FTP	
		MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	11.28	2.79	12.56	2.22	13.66	2.68	11.91	2.46	12.53	2.42
1968	18	12.14	2.36	13.54	2.72	15.02	2.97	12.83	2.44	13.58	2.62
1969	21	11.61	2.11	12.96	2.01	13.97	2.14	12.28	2.00	12.90	2.00
1970	22	11.36	2.19	12.83	2.34	13.78	2.45	12.08	2.22	12.73	2.30
1971	27	11.74	3.11	12.85	3.26	13.81	3.56	12.26	3.16	12.84	3.27
1972	30	11.65	3.20	12.74	3.44	13.98	3.86	12.20	3.29	12.80	3.46
1973	35	11.62	3.23	13.10	3.76	14.19	4.27	12.35	3.46	13.03	3.68
1974	10	11.04	2.51	11.97	2.98	12.96	3.15	11.51	2.74	12.02	2.91
TOTAL	180	11.59	2.77	12.87	2.99	13.97	3.28	12.23	2.84	12.86	2.97

Table 16
FY73 EMISSION FACTOR PROGRAM

FUEL ECONOMY IN MILES PER GALLON

LOS ANGELES

YEAR	N	COLD TRANSIENT		COLD STABILIZED		HOT TRANSIENT		1972 FTP		1975 FTP	
		MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	12.79	3.15	13.28	2.17	16.09	2.97	13.64	2.46	13.85	2.39
1968	18	13.25	2.81	14.11	3.31	16.76	3.17	13.69	3.02	14.53	3.11
1969	21	13.24	2.81	14.31	2.19	16.78	2.74	13.77	2.43	14.65	2.41
1970	22	12.53	3.76	12.64	3.78	15.72	3.74	12.59	3.39	13.33	3.50
1971	27	12.62	4.09	13.37	3.94	15.80	4.52	13.06	3.97	13.78	4.08
1972	30	12.73	3.34	12.81	3.46	15.42	3.92	12.77	3.35	13.41	3.51
1973	35	11.89	3.08	12.55	3.24	14.48	3.36	12.22	3.13	12.97	3.25
1974	10	10.90	2.57	11.06	2.57	12.94	2.60	10.96	2.53	11.48	2.55
TOTAL	180	12.51	3.31	13.03	3.33	15.46	3.70	12.77	3.22	13.44	3.33

Table 17

1972 FTP RESULTS COMPARING FY 71, FY 72, AND FY 73 VEHICLES FOR ALL CITIES, EXCLUDING DENVER AND LOS ANGELES

Emissions in GM/MI - Fuel Economy in MI/GAL - Ave. Mileage in Thousands

YEAR		1971 PROGRAM MEAN	1971 PROGRAM STD DEVIATION	1972 PROGRAM MEAN	1972 PROGRAM STD DEVIATION	1973 PROGRAM MEAN	1973 PROGRAM STD DEVIATION
1966	N	67	--	68	--		
	Ave. Miles	61.8	--	71.7	--		
	HC	9.20	6.18	10.54	8.64		
	CO	103.3	43.2	109.5	53.6		
	NOX	3.44	1.71	3.09	1.54		
	MPG	13.5	2.6	13.6	2.8		
1967	N	54	--	72	--	68	--
	Ave. Miles	54.6	--	67.0	--	68.1	--
	HC	8.19	3.61	8.64	5.16	9.75	6.23
	CO	103.5	47.7	103.6	59.3	121.08	58.71
	NOX	3.26	1.45	3.38	1.64	3.97	1.81
	MPG	13.5	3.1	13.6	2.4	11.92	2.56
1968	N	99	--	84	--	72	--
	Ave. Miles	48.5	--	57.9	--	61.0	--
	HC	6.40	7.82	6.85	5.49	7.97	9.31
	CO	78.91	62.98	75.8	41.3	89.76	52.34
	NOX	4.31	1.85	4.12	1.67	4.97	2.42
	MPG	13.0	3.1	13.6	2.7	12.23	2.79
1969	N	72	--	88	--	44	--
	Ave. Miles	39.9	--	51.2	--	57.8	--
	HC	5.99	5.22	5.54	3.14	7.14	6.11
	CO	70.73	37.73	74.7	41.9	81.62	41.35
	NOX	5.29	2.30	4.88	1.90	5.34	2.08
	MPG	13.1	2.9	13.5	2.9	12.53	2.28
1970	N	70	--	108	--	88	--
	Ave. Miles	29.5	--	36.8	--	51.4	--
	HC	4.22	1.99	5.64	5.04	6.02	3.73
	CO	55.16	26.72	66.1	45.7	79.84	34.03
	NOX	5.02	1.63	4.16	1.61	4.79	2.05
	MPG	13.0	3.3	13.9	3.4	12.01	2.34
1971	N	80	--	120	--	108	--
	Ave. Miles	15.6	--	26.4	--	37.4	--
	HC	3.42	1.47	4.41	2.50	4.85	2.89
	CO	46.33	28.29	60.4	39.4	61.89	35.34
	NOX	4.99	1.79	4.24	1.57	4.67	1.89
	MPG	12.7	3.9	13.4	4.0	12.31	3.34
1972	N			140	--	120	--
	Ave. Miles			14.8	--	29.7	--
	HC			3.42	2.50	4.69	4.27
	CO			43.8	25.8	63.55	46.17
	NOX			4.52	1.55	4.75	1.98
	MPG			12.9	3.3	12.04	3.18
1973	N					140	--
	Ave. Miles					18.1	--
	HC					4.07	2.06
	CO					53.40	33.62
	NOX					3.47	1.62
	MPG					12.01	3.07
1974	N					40	--
	Ave. Miles					5.8	--
	HC					3.42	1.45
	CO					41.03	24.70
	NOX					2.88	1.21
	MPG					10.96	2.41

Table 18

1972 FTP RESULTS COMPARING FY 71, FY 72,
AND FY 73 VEHICLES FOR DENVER

Emissions in GMS/MI - Fuel Economy
in MI/GAL - Ave. Mileage in Thousands

		1971 PROGRAM		1972 PROGRAM		1973 PROGRAM	
YEAR		MEAN	STD DEVIATION	MEAN	STD DEVIATION	MEAN	STD DEVIATION
1966	N	16	--	17	--		
	Ave. Miles	57.1	--	60.6			
	HC	10.06	3.23	10.97	7.41		
	CO	159.34	63.95	132.73	55.71		
	NOX	2.05	1.54	2.40	1.57		
	MPG	12.4	2.6	12.5	2.5		
1967	N	15	--	18	--	17	--
	Ave. Miles	57.6	--	69.8	--	66.4	--
	HC	10.06	3.03	15.23	9.55	11.02	3.58
	CO	137.43	34.78	172.00	51.43	156.94	47.02
	NOX	1.81	0.86	1.67	0.90	2.26	1.33
	MPG	12.7	2.4	12.0	2.2	11.91	2.46
1968	N	18	--	21	--	18	--
	Ave. Miles	42.1	--	51.4	--	63.5	--
	HC	8.74	4.08	8.23	5.22	8.41	3.31
	CO	122.92	46.05	121.31	83.14	106.76	36.57
	NOX	2.38	1.11	2.66	1.20	3.15	1.28
	MPG	12.0	3.8	11.8	2.7	12.83	2.44
1969	N	17	--	22	--	21	--
	Ave. Miles	38.9	--	46.1	--	54.7	--
	HC	7.74	4.89	6.86	1.60	7.98	2.59
	CO	92.62	57.72	113.92	42.50	115.52	41.81
	NOX	2.72	1.13	2.79	1.38	3.67	1.61
	MPG	13.2	3.1	12.8	3.0	12.28	2.00
1970	N	17	--	27	--	22	--
	Ave. Miles	26.0	--	31.6	--	43.7	--
	HC	7.85	4.23	6.36	1.72	7.53	2.70
	CO	110.18	39.76	102.95	37.78	117.37	35.52
	NOX	2.72	1.13	3.18	1.09	3.14	1.48
	MPG	12.2	2.6	12.6	2.5	12.08	2.22
1971	N	20	--	30	--	27	--
	Ave. Miles	15.2	--	19.2	--	32.7	--
	HC	6.73	2.10	5.89	2.13	6.16	1.74
	CO	100.04	39.72	92.04	44.15	106.66	25.17
	NOX	3.04	1.55	2.76	1.34	3.09	1.15
	MPG	11.5	2.3	13.1	3.6	12.29	3.14
1972	N			35	--	30	--
	Ave. Miles			14.1	--	27.5	--
	HC			5.61	4.34	5.92	2.03
	CO			90.42	35.79	98.49	52.01
	NOX			3.00	1.37	3.30	1.51
	MPG			12.1	3.0	12.20	3.28
1973	N					35	--
	Ave. Miles					14.3	--
	HC					5.03	1.95
	CO					93.34	41.92
	NOX					1.99	0.93
	MPG					12.35	3.46
1974	N					10	--
	Ave. Miles					5.3	--
	HC					4.47	0.55
	CO					83.37	14.64
	NOX					1.84	0.67
	MPG					11.51	2.74

Table 19

1972 FTP RESULTS COMPARING FY 71, FY 72,
AND FY 73 VEHICLES FOR LOS ANGELES

Emissions in GMS/MI - Fuel Economy
in MI/GAL - Ave. Mileage in Thousands

		1971 PROGRAM		1972 PROGRAM		1973 PROGRAM	
YEAR		MEAN	STD DEVIATION	MEAN	STD DEVIATION	MEAN	STD DEVIATION
1966	N	16	--	17	--		
	Ave. Miles	65.7	--	73.0	--		
	HC	8.72	8.64	7.97	11.31		
	CO	78.12	38.29	98.31	42.27		
	NOX	3.23	1.45	3.41	1.97		
	MPG	12.8	3.2	12.5	2.1		
1967	N	17	--	18	--	17	--
	Ave. Miles	56.4	--	66.7	--	62.1	--
	HC	6.22	3.52	6.25	4.75	7.58	11.48
	CO	81.43	38.01	87.77	52.23	87.06	72.20
	NOX	3.30	1.45	3.70	1.75	2.88	1.51
	MPG	12.4	2.9	12.6	2.4	13.04	2.46
1968	N	15	--	21	--	18	--
	Ave. Miles	37.3	--	65.0	--	63.5	--
	HC	5.65	2.21	7.63	5.54	7.01	5.36
	CO	78.00	39.77	71.74	32.31	85.24	78.29
	NOX	3.76	1.99	4.94	1.96	3.79	1.85
	MPG	13.8	2.4	12.9	1.9	13.69	3.02
1969	N	17	--	22	--	21	--
	Ave. Miles	38.1	--	49.5	--	65.0	--
	HC	5.36	1.21	6.24	3.30	6.16	3.46
	CO	87.07	25.37	84.26	32.63	82.81	49.49
	NOX	5.45	2.12	4.60	1.65	3.53	1.41
	MPG	11.9	2.6	12.0	2.6	13.77	2.43
1970	N	16	--	27	--	22	--
	Ave. Miles	25.2	--	40.2	--	51.0	--
	HC	5.22	2.78	7.51	7.18	7.93	9.00
	CO	62.59	29.45	90.14	42.49	78.33	61.81
	NOX	4.31	1.69	4.44	1.50	3.51	1.48
	MPG	12.5	2.8	12.3	2.7	12.59	3.39
1971	N	21	--	30	--	27	--
	Ave. Miles	15.9	--	32.1	--	47.5	--
	HC	3.51	0.99	4.54	1.77	4.38	2.50
	CO	51.90	22.49	69.19	26.88	63.35	50.62
	NOX	3.81	1.09	3.78	1.02	3.13	1.01
	MPG	13.1	4.5	12.7	3.4	13.00	3.97
1972	N			35	--	30	--
	Ave. Miles			17.6	--	32.9	--
	HC			4.07	4.87	4.08	2.30
	CO			55.77	25.41	48.35	22.36
	NOX			3.87	1.15	3.63	0.97
	MPG			11.4	2.8	12.77	3.35
1973	N					35	--
	Ave. Miles					21.5	--
	HC					4.27	4.49
	CO					47.93	38.41
	NOX					3.00	1.15
	MPG					12.22	3.13
1974	N					10	--
	Ave. Miles					11.3	--
	HC					3.26	0.77
	CO					40.82	19.33
	NOX					2.23	1.18
	MPG					10.98	2.53

Table 20

COMPARISON OF NEW VEHICLES IN THE FY 71, FY 72, AND FY 73 EMISSION FACTOR PROGRAMS-MEAN EMISSION LEVELS

1972 FTP (grams/mi)

	Program & Vehicle Year	Four Cities		Denver		Los Angeles	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
HC	1971	3.42	1.47	6.73	2.10	3.51	0.99
	1972	3.42	2.50	5.61	4.34	4.07	4.87
	1973	4.07	2.06	5.03	1.95	4.27	4.49
CO	1971	46.33	28.29	100.04	39.72	51.90	22.49
	1972	43.79	25.84	90.42	35.79	55.77	25.41
	1973	53.40	33.62	93.34	41.92	47.93	38.41
NOX	1971	4.99	1.79	3.04	1.55	3.81	1.09
	1972	4.52	1.55	3.00	1.37	3.83	1.15
	1973	3.47	1.62	1.99	0.93	3.00	1.15

1975 FTP (grams/mi)

	Vehicle Year	Four Cities		Denver		Los Angeles	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
HC	1971	3.07	1.36	5.59	1.42	3.02	0.79
	1972	3.02	2.22	4.75	2.42	3.56	4.24
	1973	3.59	1.61	4.54	1.79	3.85	4.24
CO	1971	39.56	25.62	88.13	35.96	42.26	19.91
	1972	36.88	24.04	80.36	32.46	46.68	24.06
	1973	46.96	32.90	84.70	41.27	39.39	32.72
NOX	1971	5.06	1.84	3.05	1.59	3.83	1.10
	1972	4.55	1.59	3.08	1.39	3.81	1.21
	1973	3.47	1.63	1.96	0.87	3.04	1.13

NOX corrected for humidity

Table 21

FY 73 EMISSION FACTOR PROGRAM

ALL CITIES EXCLUDING
DENVER AND LOS ANGELES

Percent Meeting
Federal Standards

	1972* Standards		1973/1974** Standards	
	Number	%	Number	%
1967	0	0	0	0
1968	1	1.3	0	0
1969	1	1.2	0	0
1970	4	4.5	2	2.3
1971	17	15.7	2	1.8
1972	22	18.3	5	4.2
1973	36	25.7	19	13.6
1974	22	55.0	18	45.0
TOTAL	103	14.3	46	6.4

* PASSING HC AND CO

** PASSING HC AND CO AND NOX

Table 22

DENVER

	Percent Meeting Federal Standards			
	1972* Standards		1973/74** Standards	
	Number	%	Number	%
1967	0	0	0	0
1968	0	0	0	0
1969	1	4.8	0	0
1970	0	0	0	0
1971	0	0	0	0
1972	1	3.3	0	0
1973	2	5.7	1	2.9
1974	0	0	0	0
TOTAL	4	2.2	1	0.6

* PASSING HC AND CO

** PASSING HC AND CO AND NOX

Table 23

FY 73 EMISSION FACTOR PROGRAM

LOS ANGELES

	Percent Meeting Federal Standards			
	1972* Standards		1973/74** Standards	
	Number	%	Number	%
1967	4	23.5	2	11.8
1968	2	11.2	1	5.6
1969	1	4.8	0	0
1970	1	4.5	1	4.5
1971	9	33.3	5	18.6
1972	10	33.3	4	13.4
1973	17	48.6	7	20.0
1974	4	40.0	3	30.0
TOTAL	48	26.7	23	12.8

* PASSING HC AND CO

** PASSING HC AND CO AND NOX

Table 24

1973 EMISSION FACTOR PROGRAM

COMPOSITE EMISSION LEVELS FOR ALL CITIES EXCLUDING DENVER AND LOS ANGELES

1975 FTP

			HYDROCARBONS GM/MI				CARBON MONOXIDE GM/MI				NOX GM/MI			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (X)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	68	68.1	9.05	5.84	7.66	1.57	106.28	53.09	95.14	1.72	4.04	1.84	3.56	1.71
1968	72	61.0	7.09	8.59	5.72	1.70	74.75	44.83	64.32	1.76	5.21	2.46	4.64	1.67
1969	54	57.8	6.30	5.77	5.19	1.69	67.69	36.24	59.08	1.75	5.56	2.16	5.12	1.54
1970	88	51.4	5.07	3.17	4.65	1.53	65.02	26.91	59.38	1.56	4.95	2.08	4.53	1.55
1971	108	37.4	4.22	2.39	3.80	1.53	51.53	32.29	43.88	1.75	4.81	2.01	4.43	1.53
1972	120	28.7	4.17	3.85	3.59	1.59	56.74	42.60	44.89	2.00	4.80	2.09	4.36	1.57
1973	140	18.1	3.59	1.61	3.33	1.45	46.96	32.90	38.89	1.64	3.47	1.83	3.17	1.54
1974	40	5.8	3.08	1.22	2.87	1.46	39.92	24.20	29.40	1.88	2.90	1.19	2.71	1.43
TOTAL	720	39.6	5.08	4.70	4.27	1.68	61.84	41.30	50.52	1.91	4.52	2.12	4.04	1.63

Table 25

1973 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DENVER

1975 FTP

			HYDROCARBONS GM/MI				CARBON MONOXIDE GM/MI				NOX GM/MI			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (X)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	66.4	9.87	2.87	9.50	1.33	140.12	42.46	139.19	1.41	2.22	1.33	1.91	1.79
1968	18	63.5	7.65	3.29	7.09	1.46	97.00	34.36	91.30	1.46	3.21	1.37	2.92	1.54
1969	21	54.7	7.27	2.20	6.74	1.36	104.61	38.69	97.18	1.51	3.76	1.64	3.41	1.56
1970	22	45.7	6.56	2.37	6.26	1.37	105.18	31.69	100.36	1.38	3.22	1.55	2.93	1.56
1971	27	32.7	5.51	1.50	5.31	1.31	96.91	22.18	94.24	1.28	3.18	1.25	2.99	1.41
1972	30	27.5	5.40	1.92	5.09	1.42	90.53	53.29	79.60	1.65	3.29	1.55	2.97	1.60
1973	35	14.3	4.54	1.79	4.23	1.48	84.70	41.27	74.46	1.71	1.96	0.87	1.79	1.54
1974	10	5.3	4.19	0.90	4.16	1.12	78.98	14.72	77.79	1.20	1.81	0.82	1.66	1.48
TOTAL	180	37.1	6.17	2.63	5.68	1.93	99.04	41.46	90.57	1.55	2.87	1.46	2.54	1.66

Table 26

1973 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR LOS ANGELES

1975 FTP

			HYDROCARBONS GM/MI				CARBON MONOXIDE GM/MI				NOX GM/MI			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (X)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	62.1	6.55	9.21	4.65	2.13	74.55	63.03	49.56	2.73	2.97	1.60	2.50	1.96
1968	18	63.5	6.27	4.62	5.34	1.80	72.61	47.51	54.37	2.14	3.87	1.86	3.36	1.83
1969	21	65.0	5.32	2.77	4.85	1.50	69.22	39.50	58.97	1.91	3.61	1.60	3.32	1.56
1970	22	51.0	4.56	4.93	4.03	1.90	60.95	51.46	53.07	1.82	3.59	1.54	3.21	1.70
1971	27	47.5	3.85	2.30	3.37	1.66	51.21	45.67	39.09	2.09	3.17	1.36	3.01	1.39
1972	30	32.9	3.56	2.07	3.11	1.66	41.35	19.06	37.29	1.59	3.61	0.97	3.50	1.29
1973	35	21.5	3.65	4.24	3.06	1.77	39.39	32.72	31.24	1.90	3.04	1.13	2.84	1.47
1974	10	11.3	2.84	0.61	2.79	1.25	33.70	18.17	29.69	1.70	2.16	1.21	1.96	1.48
TOTAL	180	43.5	4.75	[illegible]	3.99	1.81	54.42	45.43	42.13	2.03	3.32	1.36	3.02	1.58

NOX CORRECTED FOR HUMIDITY

Table 27

FY73 EMISSION FACTOR PROGRAM

1975 FTP RESULTS BY INERTIA WEIGHT FOR

ALL CITIES, EXCLUDING DENVER AND LOS ANGELES

EMISSIONS IN GM/MI -FUEL ECONOMY IN MI/GAL

INERTIA WT. (LBS)	1967		1968		1969		1970		1971		1972		1973		1974		TOTAL	
	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
<=2000	N= 4		N= 2		N= 3		N= 6		N= 7		N= 0		N= 4		N= 1		N= 27	
HC	5.26	0.56	8.26	3.99	6.96	7.96	3.97	1.41	3.97	1.96	0.0	0.0	3.14	1.28	2.61	0.0	4.97	3.19
CO	66.27	4.77	91.70	56.71	86.30	99.06	32.51	15.34	32.96	16.24	0.0	0.0	36.17	21.63	23.46	8.6	47.32	38.16
NOX	3.17	2.44	2.96	0.73	2.24	1.41	3.69	1.73	3.76	1.65	0.0	0.0	2.47	0.78	1.56	0.0	3.14	1.56
FUEL ECONOMY	21.73	3.74	17.99	3.99	21.46	2.24	23.57	4.15	23.53	4.65	0.0	0.0	23.27	3.84	25.73	0.0	22.48	3.95
2001-2500	N= 4		N= 7		N= 1		N= 7		N= 13		N= 14		N= 17		N= 3		N= 76	
HC	0.0	0.0	4.55	1.95	5.65	0.0	4.75	1.97	4.57	4.24	3.36	1.66	3.74	2.54	3.94	2.32	3.82	2.56
CO	0.0	0.0	61.15	19.86	53.43	0.0	51.37	2.14	37.85	10.48	43.76	23.04	41.95	19.33	36.42	13.52	42.86	19.96
NOX	0.0	0.0	2.26	0.52	5.12	0.0	3.91	0.47	3.57	1.71	3.59	1.36	3.43	1.12	2.97	0.53	3.62	1.60
FUEL ECONOMY	0.0	0.0	23.76	0.66	17.09	0.0	17.69	1.75	21.99	2.56	18.93	3.11	19.13	3.23	21.97	2.61	19.52	3.15
2501-3000	N= 8		N= 9		N= 11		N= 8		N= 9		N= 9		N= 24		N= 1		N= 79	
HC	9.22	5.80	4.96	1.97	3.92	6.71	4.14	1.49	3.51	1.09	4.81	0.86	3.83	1.21	2.76	0.0	4.31	2.72
CO	92.76	29.86	59.34	36.19	54.32	34.54	68.75	43.48	46.54	26.71	43.84	22.42	53.81	34.47	34.35	0.0	56.68	33.68
NOX	4.16	1.99	5.62	3.25	6.41	2.00	4.63	2.31	5.65	2.41	4.59	1.56	3.36	1.32	2.55	0.0	4.41	2.24
FUEL ECONOMY	14.45	1.65	16.23	2.29	15.48	1.77	15.71	2.55	16.58	3.21	15.81	3.17	15.46	3.15	14.39	0.0	15.46	2.77
3001-3500	N= 14		N= 23		N= 22		N= 16		N= 24		N= 15		N= 14		N= 6		N= 136	
HC	7.62	3.19	5.49	1.68	5.52	4.64	5.42	1.47	4.86	2.76	3.83	1.65	3.91	1.86	3.35	1.67	5.61	2.84
CO	92.78	55.19	64.95	29.97	57.81	33.22	63.74	28.62	56.87	36.86	45.73	33.29	43.62	24.57	31.42	28.87	56.36	35.65
NOX	4.54	2.16	5.76	2.51	5.76	1.69	4.66	1.66	4.51	1.51	4.15	1.22	2.99	1.64	2.49	0.73	4.69	1.96
FUEL ECONOMY	13.63	2.58	13.57	1.54	13.76	1.75	13.41	1.42	12.68	1.64	12.36	1.98	12.71	2.67	12.66	3.48	13.11	1.94
3501-4000	N= 34		N= 21		N= 27		N= 22		N= 23		N= 20		N= 35		N= 15		N= 207	
HC	8.69	3.54	10.84	14.41	7.71	6.06	5.67	4.89	4.16	1.35	5.36	4.35	3.90	1.39	2.81	1.49	6.48	6.96
CO	116.89	57.18	94.23	56.99	86.99	35.15	67.27	25.06	56.94	33.34	69.33	53.04	46.86	27.06	36.56	22.29	73.96	49.62
NOX	4.18	1.86	4.42	1.71	5.47	1.61	4.64	1.76	5.22	1.69	4.75	1.64	3.13	1.18	2.79	1.19	4.27	1.82
FUEL ECONOMY	11.83	1.75	12.25	2.54	12.98	1.96	12.16	1.94	11.66	1.38	11.29	1.66	11.76	1.61	11.76	0.83	11.87	1.72
4001-4500	N= 9		N= 11		N= 14		N= 20		N= 21		N= 22		N= 25		N= 11		N= 142	
HC	7.41	3.49	6.13	2.61	6.11	6.12	4.51	1.64	4.64	1.83	5.65	6.18	3.65	1.39	3.31	1.64	4.35	3.79
CO	119.66	72.33	68.32	47.66	71.69	39.44	71.23	24.15	57.12	34.86	66.69	48.77	49.64	42.46	42.46	26.45	63.55	46.85
NOX	4.88	1.98	5.75	2.87	6.29	2.92	5.26	1.61	5.66	2.22	5.85	2.37	4.42	2.41	3.57	1.52	5.15	2.46
FUEL ECONOMY	11.16	2.16	10.73	1.75	11.46	1.11	12.07	1.16	11.44	1.96	10.62	1.46	10.76	1.11	9.97	0.65	10.81	1.32
4501-5000	N= 9		N= 9		N= 6		N= 7		N= 11		N= 12		N= 14		N= 3		N= 92	
HC	16.95	19.44	10.36	13.99	5.08	4.88	6.28	1.62	5.59	4.63	5.13	6.79	4.69	1.76	4.16	4.28	9.64	7.16
CO	143.56	21.57	96.54	15.69	91.48	18.59	79.69	9.31	57.56	44.78	69.66	42.42	47.99	22.99	10.89	5.36	56.02	39.18
NOX	3.74	0.31	6.43	2.64	6.42	4.79	6.26	1.11	5.69	2.21	6.43	2.33	4.17	2.41	2.42	1.26	5.18	2.49
FUEL ECONOMY	9.71	1.35	10.17	1.59	10.63	1.16	11.26	0.68	9.73	1.56	11.46	1.16	9.88	1.12	11.14	0.77	10.11	1.25
>5000	N= 6		N= 3		N= 4		N= 3		N= 6		N= 4		N= 5		N= 4		N= 31	
HC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.91	6.69	3.09	0.81	0.0	0.0	3.57	3.54
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	154.95	152.54	37.83	8.45	0.0	0.0	31.30	69.81
NOX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.53	3.16	3.98	0.72	0.0	0.0	3.05	1.93
FUEL ECONOMY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.48	2.23	9.17	0.66	0.0	0.0	9.25	1.44
TOTAL	N= 68		N= 77		N= 89		N= 88		N= 140		N= 126		N= 146		N= 44		N= 774	
HC	8.85	5.84	7.09	8.59	6.36	5.71	5.07	3.17	4.64	2.39	4.11	3.65	3.59	1.61	3.66	1.64	5.66	4.76
CO	116.28	53.69	74.75	44.63	67.69	36.29	65.02	26.91	51.53	32.29	56.76	42.66	46.96	31.96	35.96	24.66	61.86	41.24
NOX	4.49	1.84	5.21	2.44	5.56	2.16	4.85	2.66	4.83	2.11	4.66	2.09	3.47	1.63	2.76	1.19	4.52	2.12
FUEL ECONOMY	12.57	2.03	11.95	2.85	13.22	2.33	12.68	2.06	11.92	2.62	11.62	2.34	12.58	2.61	11.39	2.98	12.49	2.11

Table 29
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR HOUSTON

COLD TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	171	73.2	41.93	18.51	39.11	1.44	510.96	262.82	460.41	1.58	18.34	7.39	16.33	1.76
1968	181	68.2	39.87	30.27	33.51	1.76	438.40	267.14	397.15	1.56	24.51	11.92	21.69	1.78
1969	211	63.6	24.13	10.34	22.57	1.42	320.30	188.47	276.59	1.73	27.67	8.90	26.14	1.43
1970	221	58.1	23.50	6.56	22.72	1.30	315.49	112.15	294.51	1.49	22.37	8.02	21.23	1.38
1971	271	38.0	23.03	9.50	21.39	1.47	308.15	189.30	267.80	1.69	23.27	9.27	21.11	1.62
1972	301	26.6	21.98	11.53	20.29	1.45	304.03	137.22	276.67	1.57	22.88	9.33	20.97	1.56
1973	351	14.5	21.11	13.16	19.06	1.52	284.15	134.08	231.79	1.73	15.89	7.55	14.27	1.66
1974	101	5.5	16.49	5.90	15.48	1.47	202.69	74.54	189.50	1.49	14.51	6.38	13.61	1.42
TOTAL	1801	41.5	25.77	16.21	22.85	1.58	327.54	184.12	285.51	1.70	21.34	9.50	19.13	1.65

Table 29
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR HOUSTON

COLD STABILIZED

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	171	73.2	33.58	16.45	30.32	1.58	494.69	270.61	417.00	1.92	14.86	6.71	13.14	1.74
1968	181	68.2	30.01	24.72	24.83	1.77	325.81	206.82	267.35	1.97	23.31	9.96	21.38	1.55
1969	211	63.6	16.27	4.26	15.76	1.30	214.16	131.74	179.80	1.85	24.95	9.39	23.17	1.51
1970	221	58.1	15.41	5.85	14.39	1.46	223.29	106.95	198.04	1.69	20.16	8.09	18.85	1.44
1971	271	38.0	17.42	10.90	15.72	1.51	274.42	167.27	221.87	1.97	19.42	9.55	16.86	1.78
1972	301	26.6	16.53	17.45	13.53	1.70	267.49	183.95	216.36	1.95	19.19	9.32	17.00	1.70
1973	351	14.5	14.40	6.32	13.18	1.53	252.20	206.40	187.76	2.22	12.32	7.67	10.86	1.67
1974	101	5.5	12.90	3.85	12.40	1.34	203.31	156.59	139.62	2.06	10.26	4.22	9.60	1.46
TOTAL	1801	41.5	18.84	14.34	16.11	1.66	277.66	198.88	216.92	2.07	18.19	9.42	15.81	1.74

FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR HOUSTON

HOT TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	171	73.2	25.50	7.85	24.40	1.36	351.27	187.06	308.84	1.69	19.81	8.62	17.66	1.73
1968	181	68.2	25.37	19.79	21.55	1.70	242.29	137.13	204.36	1.87	27.28	11.34	25.03	1.56
1969	211	63.6	13.71	3.51	13.30	1.29	164.75	113.94	133.66	1.92	30.13	11.14	28.62	1.50
1970	221	58.1	14.76	7.63	13.53	1.49	150.04	56.74	139.72	1.48	23.94	8.38	22.70	1.39
1971	271	38.0	13.91	5.54	13.15	1.38	177.68	126.75	146.56	1.83	25.35	11.68	22.56	1.69
1972	301	26.6	14.20	8.90	12.73	1.54	193.68	122.73	162.68	1.82	24.14	11.62	21.84	1.60
1973	351	14.5	12.99	5.42	12.00	1.49	177.26	133.50	143.84	1.91	16.69	9.46	14.90	1.68
1974	101	5.5	11.86	3.73	11.38	1.35	144.67	92.02	123.95	1.83	14.95	6.67	13.82	1.51
TOTAL	1801	41.5	15.99	9.83	14.26	1.56	196.40	135.59	160.47	1.88	22.94	10.75	20.41	1.67

NOX CORRECTED FOR HUMIDITY

Table 31
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR HOUSTON

1972 FTP

YEAR	N	MEAN MILES (K)	% BELOW LEVEL * HC	% BELOW LEVEL * CO	% BELOW LEVEL * NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	HYDROCARBONS GM/MI ARITHMETIC SD	HYDROCARBONS GM/MI GEOMETRIC MEAN	HYDROCARBONS GM/MI GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	CARBON MONOXIDE GM/MI ARITHMETIC SD	CARBON MONOXIDE GM/MI GEOMETRIC MEAN	CARBON MONOXIDE GM/MI GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	NOX GM/MI ARITHMETIC SD	NOX GM/MI GEOMETRIC MEAN	NOX GM/MI GEOMETRIC SD
1967	17	73.2	0	0	23	10.07	4.44	9.34	1.47	134.09	66.26	119.15	1.66	4.43	1.61	3.97	1.69
1968	18	68.2	5	0	5	9.32	4.68	8.61	1.68	101.96	45.55	91.96	1.61	4.36	2.79	3.66	1.53
1969	21	63.6	0	19	4	5.39	1.76	5.17	1.32	71.26	36.67	62.85	1.67	7.44	2.34	6.81	1.45
1970	22	58.1	0	4	4	5.19	1.47	5.01	1.30	71.84	22.88	68.39	1.48	5.47	1.09	5.36	1.40
1971	27	38.0	11	14	18	5.39	2.31	5.05	1.42	77.68	47.14	66.58	1.75	5.09	2.44	5.10	1.66
1972	30	28.6	10	6	10	5.14	3.79	4.57	1.51	76.20	41.37	66.94	1.66	5.01	2.44	5.09	1.60
1973	35	14.5	25	22	34	4.73	2.10	4.37	1.49	68.85	43.04	58.66	1.82	3.76	1.96	3.38	1.64
1974	10	9.5	40	50	50	3.92	1.21	3.75	1.38	54.13	29.43	46.67	1.80	3.36	1.46	3.10	1.42
TOTAL	180	41.5	11	13	17	5.95	3.76	5.28	1.57	80.69	47.38	69.16	1.75	5.27	2.48	4.76	1.65

NOX CORRECTED FOR HUMIDITY

* HC 3.4 GM/MI
CO 39.3 GM/MI
NOX 3.0 GM/MI

Table 32
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR HOUSTON

1975 FTP

YEAR	N	MEAN MILES (K)	HYDROCARBONS GM/MI ARITHMETIC MEAN	HYDROCARBONS GM/MI ARITHMETIC SD	HYDROCARBONS GM/MI GEOMETRIC MEAN	HYDROCARBONS GM/MI GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	CARBON MONOXIDE GM/MI ARITHMETIC SD	CARBON MONOXIDE GM/MI GEOMETRIC MEAN	CARBON MONOXIDE GM/MI GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	NOX GM/MI ARITHMETIC SD	NOX GM/MI GEOMETRIC MEAN	NOX GM/MI GEOMETRIC SD
1967	17	73.2	8.82	3.66	8.22	1.46	121.95	61.07	107.42	1.71	4.54	1.86	4.11	1.63
1968	18	68.2	8.22	4.11	7.05	1.68	86.99	43.22	78.44	1.72	4.59	2.77	4.08	1.51
1969	21	63.6	4.59	1.23	4.44	1.28	59.44	33.43	51.78	1.71	7.20	2.51	6.75	1.47
1970	22	58.1	4.52	1.38	4.34	1.35	59.26	20.87	55.96	1.41	5.79	2.12	5.47	1.40
1971	27	38.0	4.70	2.16	4.40	1.61	67.76	43.36	57.06	1.80	5.35	2.58	5.21	1.69
1972	30	28.6	4.34	3.59	3.99	1.54	67.82	40.16	58.22	1.75	5.70	2.55	5.16	1.61
1973	35	14.5	4.12	1.57	3.84	1.47	62.24	43.75	50.79	1.90	3.82	1.98	3.43	1.64
1974	10	9.5	3.57	1.05	3.43	1.34	49.72	30.21	41.10	1.95	3.34	1.42	3.12	1.45
TOTAL	180	41.5	5.20	3.34	4.62	1.56	70.75	44.49	59.25	1.82	5.39	2.59	4.80	1.66

NOX CORRECTED FOR HUMIDITY

Table 33
FY73 EMISSION FACTOR PROGRAM

FUEL ECONOMY IN MILES PER GALLON

HOUSTON

YEAR	N	COLD TRANSIENT MEAN	COLD TRANSIENT SD	COLD STABILIZED MEAN	COLD STABILIZED SD	HOT TRANSIENT MEAN	HOT TRANSIENT SD	1972 FTP MEAN	1972 FTP SD	1975 FTP MEAN	1975 FTP SD
1967	17	10.24	2.01	10.68	2.17	12.20	2.23	10.57	2.05	11.07	2.09
1968	18	9.99	1.88	11.17	2.01	12.40	2.06	10.57	1.83	11.20	1.92
1969	21	11.31	1.91	12.26	1.96	13.21	2.66	11.80	1.82	12.36	1.90
1970	22	10.56	2.19	11.28	2.17	12.87	2.22	10.93	2.17	11.51	2.16
1971	27	11.00	2.79	11.39	2.79	13.18	3.09	11.20	2.77	11.74	2.84
1972	30	10.52	2.49	10.97	2.61	12.49	2.94	10.75	2.52	11.24	2.64
1973	35	10.77	2.57	10.98	2.55	12.67	2.62	10.88	2.50	11.35	2.58
1974	10	10.19	2.39	10.20	1.94	11.77	2.23	10.20	2.15	10.56	2.10
TOTAL	180	10.63	2.33	11.18	2.39	12.67	2.62	10.91	2.31	11.42	2.38

Table 34

FY 73 EMISSION FACTOR PROGRAM

HOUSTON

	Percent Meeting Federal Standards			
	1972* Standards		1973/74** Standards	
	Number	%	Number	%
1967	0	0	0	0
1968	0	0	0	0
1969	0	0	0	0
1970	0	0	0	0
1971	3	11.2	0	0
1972	1	3.3	0	0
1973	4	11.4	3	8.6
1974	5	50.0	4	40.0
TOTAL	13	7.2	7	3.9

* PASSING HC AND CO

** PASSING HC AND CO AND NOX

Table 35
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DETROIT

COLD TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	68.8	47.72	25.34	42.64	1.61	528.24	257.48	481.58	1.54	19.48	7.89	17.44	1.72
1968	18	57.4	41.92	21.54	28.70	2.62	396.13	350.89	305.39	2.00	22.15	10.91	19.25	1.65
1969	21	54.8	32.98	23.96	28.00	1.71	382.62	271.47	316.32	1.86	22.38	6.84	21.24	1.43
1970	22	44.6	27.53	23.61	23.16	1.72	298.17	129.95	265.99	1.66	25.55	7.28	24.41	1.36
1971	27	35.5	22.55	12.64	20.35	1.54	267.76	116.40	242.26	1.63	21.22	7.26	19.90	1.47
1972	30	25.5	27.18	30.12	21.87	1.74	315.08	261.62	257.17	1.82	21.43	8.13	19.24	1.72
1973	35	19.0	19.59	16.21	17.25	1.52	209.26	73.56	197.85	1.41	17.33	6.36	16.24	1.45
1974	10	6.4	18.71	9.19	16.37	1.78	206.26	79.63	185.79	1.51	14.61	6.00	13.76	1.44
TOTAL	180	37.7	28.67	29.21	23.65	1.78	314.83	225.84	264.10	1.77	20.72	7.87	18.94	1.56

Table 36
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DETROIT

COLD STABILIZED

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	68.8	38.20	22.21	33.26	1.70	480.43	221.18	442.41	1.50	15.25	7.51	13.32	1.77
1968	18	57.4	37.29	65.84	23.95	2.65	290.02	213.22	233.29	1.96	23.20	11.53	19.85	1.88
1969	21	54.8	24.64	21.64	21.01	1.62	287.42	145.68	254.99	1.66	21.89	6.86	20.80	1.40
1970	22	44.6	22.81	22.67	18.35	1.79	282.23	136.80	246.62	1.78	21.74	7.26	20.54	1.43
1971	27	35.5	13.81	5.92	12.81	1.47	188.63	129.39	155.90	1.91	18.62	7.32	17.12	1.54
1972	30	25.5	19.69	23.98	14.76	1.96	273.92	208.80	214.06	2.03	17.66	8.96	15.37	1.78
1973	35	19.0	13.61	6.04	12.56	1.49	201.24	110.14	168.97	1.92	12.92	5.73	11.88	1.51
1974	10	6.4	12.37	7.21	10.58	1.81	157.47	139.50	109.16	2.47	11.59	5.26	10.03	1.54
TOTAL	180	37.7	21.68	27.48	16.67	1.87	264.23	181.37	210.56	2.02	17.86	8.48	15.81	1.68

Table 37
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DETROIT

HOT TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	68.8	27.34	15.93	24.18	1.63	337.11	148.45	312.03	1.49	19.19	7.33	17.66	1.57
1968	18	57.4	26.73	44.03	18.25	1.93	186.39	122.65	152.56	1.94	27.36	10.99	24.67	1.86
1969	21	54.8	18.20	12.90	16.06	1.57	191.10	113.41	162.36	1.80	26.43	6.89	25.55	1.32
1970	22	44.6	18.13	18.85	15.63	1.64	165.73	65.94	152.69	1.56	28.64	8.47	26.71	1.40
1971	27	35.5	11.95	4.02	11.45	1.33	128.64	71.39	115.40	1.58	24.42	8.68	22.87	1.46
1972	30	25.5	17.12	19.87	13.70	1.73	196.86	180.94	151.88	1.98	23.42	10.33	20.49	1.83
1973	35	19.0	11.95	3.35	11.50	1.33	135.39	56.78	123.55	1.57	17.51	6.26	16.54	1.41
1974	10	6.4	12.25	4.97	11.20	1.40	123.09	54.91	111.45	1.62	15.25	4.51	14.70	1.33
TOTAL	180	37.7	17.24	19.15	14.26	1.66	178.30	124.72	146.54	1.80	22.88	9.07	20.88	1.58

NOX CORRECTED FOR HUMIDITY

Table 38
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DETROIT

1972 FTP

YEAR	N	MEAN MILES (MI)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
1967	17	38.81	0	0	17	11.45	5.42	10.41	1.57	134.49	58.02	125.49	1.47	4.83	1.92	4.15	1.7
1968	18	37.41	0	16	22	10.38	10.85	7.13	1.99	91.09	71.32	73.64	1.96	4.45	2.76	3.34	1.86
1969	21	34.81	0	4	0	7.88	5.67	6.84	1.64	89.24	48.88	77.84	1.72	3.90	1.53	3.71	1.51
1970	22	44.61	13	9	4	8.71	8.11	5.54	1.71	77.12	27.33	74.76	1.41	4.32	1.85	4.02	1.39
1971	27	35.51	14	11	14	4.85	2.71	4.30	1.48	80.85	28.08	77.80	1.42	5.21	2.21	4.84	1.47
1972	30	25.51	23	23	13	6.25	7.14	4.99	1.75	78.53	34.18	83.46	1.71	5.21	2.21	4.84	1.73
1973	35	19.01	25	31	20	4.43	2.42	4.06	1.46	54.73	22.49	50.12	1.55	4.43	1.54	3.77	1.45
1974	10	6.41	40	50	50	4.14	2.10	3.81	1.76	47.76	27.14	41.26	1.76	3.99	1.48	3.65	1.47
TOTAL	180	37.71	15	17	15	8.71	7.26	5.41	1.77	77.21	53.61	65.27	1.77	5.14	4.71	4.00	1.59

NOX CORRECTED FOR HUMIDITY

*
HC 3.4 GM/MI
CO 39.0 GM/MI
NOX 3.0 GM/MI

Table 39
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DETROIT

1975 FTP

YEAR	N	MEAN MILES (MI)	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
1967	17	38.81	9.91	4.94	8.95	1.57	119.96	50.04	111.78	1.46	4.81	1.91	4.17	1.84
1968	18	37.41	9.41	15.56	6.32	1.98	75.55	54.57	61.93	1.88	6.44	2.81	5.09	1.76
1969	21	34.81	6.36	4.54	5.74	1.61	74.79	33.47	65.74	1.70	6.21	1.62	6.00	1.32
1970	22	44.61	6.30	5.76	4.97	1.70	67.21	25.53	61.62	1.61	6.49	1.94	6.19	1.39
1971	27	35.51	4.04	1.47	3.82	1.40	50.28	20.65	45.29	1.57	5.56	1.91	5.19	1.48
1972	30	25.51	5.48	6.38	4.16	1.76	69.55	34.63	55.66	1.92	5.36	2.38	4.74	1.76
1973	35	19.01	3.85	1.45	3.62	1.41	49.12	21.58	44.36	1.61	4.85	1.52	4.60	1.41
1974	10	6.41	3.65	1.79	3.23	1.73	41.83	23.81	35.29	1.85	3.54	1.35	3.34	1.42
TOTAL	180	37.71	5.65	6.54	4.73	1.74	66.63	43.34	56.09	1.81	5.31	2.17	4.82	1.59

NOX CORRECTED FOR HUMIDITY

Table 40
FY73 EMISSION FACTOR PROGRAM

FUEL ECONOMY IN MILES PER GALLON

DETROIT

YEAR	N	COLD TRANSIENT MEAN	COLD TRANSIENT SD	COLD STABILIZED MEAN	COLD STABILIZED SD	HOT TRANSIENT MEAN	HOT TRANSIENT SD	1972 FTP MEAN	1972 FTP SD	1975 FTP MEAN	1975 FTP SD
1967	17	10.58	2.03	11.81	1.94	13.18	2.67	11.19	1.89	11.86	1.91
1968	18	11.50	2.88	12.49	2.44	13.91	2.39	11.99	2.61	12.62	2.47
1969	21	11.65	2.55	12.78	2.43	14.34	2.69	12.21	2.41	12.9[illegible]	2.47
1970	22	11.70	2.33	12.12	1.99	13.83	2.40	11.92	2.11	12.45	2.12
1971	27	11.68	3.13	12.52	3.37	14.04	3.77	12.10	3.22	12.71	3.39
1972	30	11.03	2.96	11.52	2.83	13.08	3.25	11.28	2.87	11.8[illegible]	2.94
1973	35	11.55	2.94	11.79	2.70	13.44	3.14	11.67	2.79	12.14	2.84
1974	10	10.49	2.16	10.70	1.71	11.91	2.18	10.60	1.96	10.96	1.89
TOTAL	180	11.34	2.71	12.00	2.59	13.54	2.94	11.67	2.80	12.23	2.66

Table 41
FY 73 EMISSION FACTOR PROGRAM
DETROIT

	Percent Meeting Federal Standards			
	1972* Standards		1973/74** Standards	
	Number	%	Number	%
1967	0	0	0	0
1968	0	0	0	0
1969	0	0	0	0
1970	2	9.2	1	4.5
1971	3	11.1	0	0
1972	5	16.7	1	3.3
1973	6	17.1	1	2.9
1974	4	40.0	2	20.0
TOTAL	20	11.1	5	2.8

* PASSING HC AND CO

** PASSING HC AND CO AND NOX

Table 42
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR ST. LOUIS

COLD TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	67.6	29.84	15.40	27.17	1.53	424.77	270.57	359.84	1.78	14.80	7.37	11.96	2.27
1968	18	56.4	24.89	14.13	22.34	1.56	378.90	260.53	330.62	1.74	14.12	5.77	12.61	1.75
1969	21	59.5	27.09	22.54	23.05	1.65	341.81	172.68	303.11	1.66	16.63	5.34	15.72	1.54
1970	22	57.3	23.35	11.49	21.12	1.56	408.21	260.63	338.17	1.88	14.75	7.65	12.64	1.91
1971	27	42.0	16.29	4.86	15.65	1.33	232.76	134.61	223.47	1.65	16.36	4.40	15.75	1.34
1972	30	36.7	15.58	5.27	14.70	1.42	229.95	147.23	195.26	1.79	19.37	5.18	18.66	1.33
1973	35	20.6	15.29	4.71	14.73	1.30	190.48	78.35	177.35	1.46	14.52	7.43	13.09	1.56
1974	10	5.1	11.95	3.79	11.56	1.33	152.98	45.66	146.89	1.35	16.89	3.53	16.66	1.38
TOTAL	180	42.7	20.60	12.54	17.83	1.56	289.55	197.32	241.95	1.80	15.69	6.31	14.16	1.66

Table 43
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR ST. LOUIS

COLD STABILIZED

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	67.6	26.27	11.04	24.38	1.48	394.65	223.55	310.97	2.31	16.95	6.69	9.68	1.91
1968	18	56.4	21.49	14.43	18.60	1.66	296.81	231.52	230.82	1.97	10.65	4.19	9.90	1.62
1969	21	59.5	24.88	27.20	19.17	1.84	295.07	151.08	259.73	1.69	13.48	5.05	12.25	1.67
1970	22	57.3	15.54	3.46	15.18	1.25	269.86	138.01	240.03	1.65	12.11	4.55	10.98	1.68
1971	27	42.0	13.13	6.33	12.04	1.51	185.52	122.88	151.64	1.94	12.09	4.33	11.30	1.44
1972	30	36.7	13.01	6.07	11.69	1.64	184.11	145.21	125.82	2.75	12.96	4.97	12.13	1.44
1973	35	20.6	11.99	5.77	11.05	1.47	158.22	100.73	131.76	1.85	9.62	5.96	8.46	1.64
1974	10	5.1	9.33	2.36	9.09	1.27	95.50	60.58	79.65	1.90	8.47	2.67	8.04	1.42
TOTAL	180	42.7	16.42	12.80	14.07	1.67	228.94	168.07	173.92	2.21	11.49	5.19	10.32	1.63

Table 44
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR ST. LOUIS

HOT TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	67.6	20.44	6.16	19.57	1.36	252.66	153.67	200.66	2.16	15.78	7.77	13.31	1.98
1968	18	56.4	16.50	8.78	14.97	1.53	183.24	145.36	148.87	1.88	16.23	5.97	14.58	1.76
1969	21	59.5	18.47	17.87	15.09	1.71	170.02	108.55	144.64	1.77	19.03	6.89	17.49	1.59
1970	22	57.3	12.14	2.92	11.83	1.25	139.44	57.63	127.35	1.58	18.19	7.65	16.91	1.49
1971	27	42.0	10.59	3.29	10.14	1.35	104.20	61.50	89.39	1.75	17.58	5.21	16.83	1.36
1972	30	36.7	11.07	3.54	10.54	1.38	110.58	76.75	88.10	2.08	19.51	5.14	18.80	1.33
1973	35	20.6	11.05	5.91	10.15	1.46	99.04	46.41	88.25	1.64	14.46	7.06	12.90	1.61
1974	10	5.1	8.54	2.05	8.34	1.26	78.00	38.16	68.82	1.73	19.86	3.26	19.43	1.36
TOTAL	180	42.7	13.28	8.44	11.92	1.52	130.72	100.36	109.97	1.94	16.86	6.70	15.36	1.59

NOX CORRECTED FOR HUMIDITY

Table 45

FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR ST. LOUIS

1972 FTP

YEAR	N	MEAN MILES (K)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
1967	17	67.6	0	5	47	7.48	2.34	7.16	1.34	109.26	39.29	95.39	1.64	3.45	1.64	2.89	1.97
1968	18	56.4	5	5	33	6.18	3.61	5.52	1.57	96.10	55.74	78.29	1.71	3.33	1.21	3.00	1.65
1969	21	59.5	0	0	14	6.93	0.99	5.88	1.72	84.92	29.36	78.84	1.46	4.44	1.34	4.25	1.53
1970	22	57.3	9	9	27	5.19	1.79	4.91	1.39	96.41	44.13	91.65	1.63	3.56	1.34	3.37	1.65
1971	27	42.0	37	25	29	3.92	1.36	3.74	1.38	58.44	31.71	51.96	1.84	3.79	1.48	3.44	1.55
1972	30	36.7	36	33	13	3.61	1.39	3.37	1.48	55.21	33.26	46.34	1.88	4.31	1.29	4.13	1.45
1973	35	26.6	51	42	62	3.64	1.31	3.47	1.34	48.49	20.37	42.52	1.54	3.66	1.71	4.91	1.56
1974	10	5.1	90	70	70	2.84	0.86	2.75	1.29	33.13	12.17	31.23	1.48	4.38	1.79	4.08	1.35
TOTAL	180	42.7	29	25	35	4.68	2.17	4.31	1.57	69.13	43.87	57.96	1.81	3.81	1.44	3.31	1.78

NOX CORRECTED FOR HUMIDITY

*
HC 3.4 GM/MI
CO 39.0 GM/MI
NOX 3.0 GM/MI

Table 46

FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR ST. LOUIS

1975 FTP

YEAR	N	MEAN MILES (K)	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
1967	17	67.6	6.77	2.14	6.46	1.37	96.19	32.29	90.33	1.96	3.91	1.84	3.67	1.92
1968	18	56.4	5.55	3.26	4.99	1.37	79.23	51.67	63.96	1.75	3.49	1.22	3.19	1.46
1969	21	59.5	6.27	0.19	5.96	1.75	71.84	35.59	64.28	1.62	4.21	1.44	3.89	1.56
1970	22	57.3	4.33	1.08	4.20	1.28	69.98	29.33	64.00	1.54	3.84	1.37	3.57	1.52
1971	27	42.0	3.49	1.29	3.31	1.38	47.15	26.82	41.28	1.68	3.89	1.13	3.72	1.35
1972	30	36.7	3.47	1.29	3.25	1.44	44.14	29.29	37.54	1.99	4.32	1.26	4.15	1.35
1973	35	26.6	3.31	1.40	3.12	1.39	39.34	19.21	35.34	1.60	3.21	1.70	2.90	1.57
1974	10	5.1	2.38	0.84	2.52	1.25	27.43	11.85	25.06	1.58	2.58	3.74	2.48	1.35
TOTAL	180	42.7	4.34	2.91	3.99	1.56	57.92	37.61	47.48	1.88	3.71	1.46	3.40	1.56

NOX CORRECTED FOR HUMIDITY

Table 47

FY73 EMISSION FACTOR PROGRAM

FUEL ECONOMY IN MILES PER GALLON

ST. LOUIS

YEAR	N	COLD TRANSIENT MEAN	COLD TRANSIENT SD	COLD STABILIZED MEAN	COLD STABILIZED SD	HOT TRANSIENT MEAN	HOT TRANSIENT SD	1972 FTP MEAN	1972 FTP SD	1975 FTP MEAN	1975 FTP SD
1967	17	12.56	2.63	14.07	2.93	15.58	2.83	13.32	2.64	14.10	2.70
1968	18	12.00	3.26	13.98	3.86	16.05	3.58	13.32	3.45	14.10	3.59
1969	21	12.63	2.53	13.60	2.55	15.66	2.58	13.15	2.47	13.90	2.49
1970	22	12.16	3.09	13.44	2.82	15.62	3.10	12.79	2.88	13.70	2.88
1971	27	12.62	3.62	13.45	3.69	15.72	3.97	13.04	3.63	13.60	3.72
1972	30	13.03	3.29	13.82	3.57	15.86	3.70	13.43	3.31	14.14	3.45
1973	35	12.32	3.23	13.09	3.19	14.91	3.70	12.71	3.16	13.37	3.27
1974	10	11.01	2.68	11.10	2.67	12.91	2.96	11.66	2.64	11.52	2.71
TOTAL	180	12.47	3.10	13.41	3.27	15.41	3.47	12.94	3.11	13.66	3.21

Table 48

FY 73 EMISSION FACTOR PROGRAM

ST. LOUIS

	Percent Meeting Federal Standards			
	1972* Standards		1973/74** Standards	
	Number	%	Number	%
1967	0	0	0	0
1968	0	0	0	0
1969	1	4.8	0	0
1970	2	9.1	1	4.5
1971	4	14.8	1	3.7
1972	5	16.7	1	3.3
1973	12	34.3	7	20.0
1974	7	70.0	6	60.0
TOTAL	31	17.2	16	8.9

* PASSING HC AND CO

** PASSING HC AND CO AND NOX

Table 49
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR NEWARK

COLD TRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	62.8	39.99	36.36	33.34	1.69	415.13	221.72	366.41	1.69	13.83	5.53	12.72	1.55
1968	18	62.1	24.53	7.22	23.56	1.34	327.11	160.11	285.58	1.80	17.14	5.11	16.46	1.37
1969	21	53.6	35.44	33.90	26.96	1.95	383.84	265.56	299.24	2.02	17.76	7.21	16.27	1.50
1970	22	45.5	35.35	25.98	28.71	1.90	366.00	248.46	313.53	1.70	14.38	5.41	13.99	1.69
1971	27	34.0	24.02	29.95	17.66	1.94	220.55	116.34	188.34	1.84	17.09	5.39	16.41	1.41
1972	30	26.1	15.29	7.03	14.16	1.45	219.28	166.77	180.47	1.83	17.35	5.52	16.46	1.39
1973	35	18.2	15.05	7.34	13.85	1.48	176.43	136.97	149.61	1.71	13.19	4.93	12.21	1.54
1974	10	6.3	12.32	5.03	11.37	1.54	124.15	64.01	111.39	1.61	9.34	2.34	9.08	1.28
TOTAL	180	37.3	24.45	23.92	19.31	1.85	269.93	187.31	217.01	1.96	15.41	5.83	14.22	1.53

Table 50
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR NEWARK

COLD STABILIZED

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	62.8	34.91	38.75	26.79	1.90	383.44	225.53	323.45	1.88	11.63	6.65	10.27	1.66
1968	18	62.1	19.07	11.41	16.94	1.39	239.52	91.84	218.54	1.61	13.76	3.48	13.28	1.34
1969	21	53.6	28.67	32.85	20.34	2.06	243.39	114.54	206.39	2.04	15.13	4.44	14.46	1.38
1970	22	45.5	17.56	5.78	16.14	1.41	233.87	140.48	186.79	2.11	12.83	5.22	11.73	1.47
1971	27	34.0	15.33	10.50	12.86	1.81	156.84	110.48	125.74	2.06	11.96	3.55	11.45	1.36
1972	30	26.1	11.36	6.21	10.27	1.55	172.66	144.82	118.41	2.91	11.72	4.85	10.76	1.53
1973	35	18.2	11.20	8.78	9.90	1.34	136.08	140.56	101.04	2.45	8.36	2.68	7.85	1.42
1974	10	6.3	8.39	2.94	7.97	1.40	94.52	94.57	68.48	2.22	6.83	2.02	6.56	1.35
TOTAL	180	37.3	17.47	19.25	13.76	1.84	204.18	160.71	147.69	2.39	11.53	4.74	10.57	1.53

Table 51
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR NEWARK

HOTTRANSIENT

			HYDROCARBONS-GRAMS				CARBON MONOXIDE-GRAMS				NOX-GRAMS			
		MEAN MILES	ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	(K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1967	17	62.8	29.33	33.47	21.85	1.83	294.70	143.84	226.79	1.82	15.19	7.66	13.49	1.69
1968	18	62.1	16.63	7.36	15.46	1.45	138.97	50.90	127.36	1.60	19.68	2.58	19.08	1.30
1969	21	53.6	25.16	29.47	17.35	2.12	149.76	82.47	129.78	1.98	20.65	7.46	19.20	1.51
1970	22	45.5	14.88	5.67	14.06	1.39	151.06	97.77	125.30	1.89	15.59	5.26	14.88	1.45
1971	27	34.0	15.89	17.60	12.61	1.95	93.57	64.96	77.12	1.87	16.94	11.24	17.14	1.54
1972	30	26.1	10.21	4.59	9.51	1.44	103.71	98.59	75.76	2.18	16.24	8.22	15.65	1.56
1973	35	18.2	9.08	4.19	8.14	1.37	89.77	97.47	67.39	1.99	12.56	4.68	11.87	1.42
1974	10	6.3	9.26	1.89	9.08	1.24	65.62	38.25	58.42	1.62	9.33	3.12	8.93	1.37
TOTAL	180	37.3	15.57	17.27	12.46	1.75	127.25	103.55	96.46	2.11	16.25	7.21	14.80	1.55

NOX CORRECTED FOR HUMIDITY

Table 52
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR NEWARK

1972 FTP

YEAR	N	MEAN MILES (K)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
1967	17	62.8	0	5	52	9.99	9.91	8.13	1.74	150.46	48.31	96.53	1.59	3.46	1.45	3.12	1.53
1968	18	62.1	5	11	5	9.81	2.18	5.50	1.39	75.55	28.26	69.17	1.44	4.12	0.98	4.01	1.29
1969	21	53.6	0	14	14	8.55	8.85	6.34	1.98	80.96	39.32	69.44	1.91	4.38	1.50	4.14	1.43
1970	22	45.5	4	9	27	6.99	3.45	6.31	1.56	79.98	37.26	71.67	1.83	3.66	1.27	3.38	1.45
1971	27	34.0	37	48	29	5.25	4.65	4.23	1.65	90.59	27.61	83.61	1.77	3.96	1.13	3.73	1.37
1972	30	26.1	53	50	26	3.55	1.64	3.29	1.48	92.26	41.65	81.78	1.93	3.88	1.30	3.66	1.42
1973	35	18.2	62	54	54	3.50	2.06	3.21	1.48	63.53	38.10	55.26	1.66	2.66	0.95	2.76	1.42
1974	10	6.3	60	80	90	2.76	0.92	2.61	1.43	29.15	26.04	24.57	1.79	2.16	0.55	2.09	1.29
TOTAL	180	37.3	31	33	35	5.39	5.38	4.50	1.86	83.21	41.88	58.96	1.98	3.39	1.31	3.35	1.47

NOX CORRECTED FOR HUMIDITY

*
HC 3.4 GM/MI
CO 39.3 GM/MI
NOX 3.0 GM/MI

Table 53
FY73 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR NEWARK

1975 FTP

YEAR	N	MEAN MILES (K)	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
1967	17	62.8	9.18	9.71	7.24	1.78	95.04	46.35	84.95	1.64	3.56	1.36	3.18	1.26
1968	18	62.1	9.21	2.21	8.87	1.28	61.25	21.20	56.53	1.38	4.35	1.04	4.20	1.31
1969	21	53.6	7.77	8.09	5.82	2.62	64.69	29.51	55.89	1.99	4.02	1.49	4.36	1.44
1970	22	45.5	5.43	1.64	5.16	1.39	63.65	31.29	56.69	1.74	3.89	1.26	3.49	1.42
1971	27	34.0	4.63	3.75	3.76	1.84	65.93	23.66	54.86	1.86	4.13	1.33	3.82	1.29
1972	30	26.1	3.17	1.67	2.94	1.46	63.68	37.38	53.38	2.06	3.79	1.36	3.37	1.43
1973	35	18.2	3.09	1.86	2.84	1.66	36.95	35.06	28.55	1.97	2.82	0.89	2.67	1.46
1974	10	6.3	2.53	0.70	2.44	1.33	24.71	18.65	24.56	1.62	2.16	0.91	2.04	1.62
TOTAL	180	37.3	4.91	4.96	3.97	1.77	52.37	36.76	41.31	2.09	3.65	1.36	3.39	1.48

NOX CORRECTED FOR HUMIDITY

Table 54
FY73 EMISSION FACTOR PROGRAM

FUEL ECONOMY IN MILES PER GALLON

NEWARK

YEAR	N	COLD TRANSIENT MEAN	SD	COLD STABILIZED MEAN	SD	HOT TRANSIENT MEAN	SD	1972 FTP MEAN	SD	1975 FTP MEAN	SD
1967	17	12.65	3.08	13.47	3.05	15.49	3.63	13.66	2.96	12.79	3.23
1968	18	12.62	2.88	14.42	2.33	15.79	2.94	13.56	2.47	14.34	2.47
1969	21	12.36	2.35	13.84	2.34	15.64	2.76	13.09	2.30	13.93	2.39
1970	22	12.10	2.89	13.09	2.88	14.93	3.41	12.66	2.79	13.30	3.01
1971	27	12.34	3.88	13.31	3.74	15.23	4.14	13.08	3.66	13.66	3.75
1972	30	12.72	3.35	13.56	3.62	15.41	4.01	13.14	3.42	13.93	3.59
1973	35	12.61	3.50	13.46	3.65	15.37	4.46	13.04	3.62	13.74	3.86
1974	10	11.97	3.02	12.35	3.07	14.19	3.46	12.16	3.03	12.72	3.15
TOTAL	180	12.53	3.16	13.47	3.27	15.38	3.80	13.01	3.12	13.75	3.28

Table 55

FY 73 EMISSION FACTOR PROGRAM

NEWARK

	Percent Meeting Federal Standards			
	1972* Standards		1973/74** Standards	
	Number	%	Number	%
1967	0	0	0	0
1968	1	5.5	0	0
1969	0	0	0	0
1970	0	0	0	0
1971	7	26.0	1	3.7
1972	11	36.7	3	10.0
1973	14	40.0	8	22.9
1974	6	60.0	6	60.0
TOTAL	39	21.7	18	10.0

* Passing HC and CO

** Passing HC and CO and NOX

Table 56

SUMMARY OF AIR CONDITIONED VEHICLE TESTS
VS. MODEL YEAR IN HOUSTON AND DETROIT

HOT START TEST PROCEDURE

MODEL YEAR	# OF VEH.	A/C SIM	A/C	HC	CO	CO2	NOX*	FUEL ECON
1967	5	ON	OFF	7.11	124.5	570.6	3.82	11.25
		OFF	ON	7.03	124.5	565.9	3.66	11.32
		OFF	OFF	6.80	117.8	551.0	3.61	11.70
		ON	OFF	6.70	116.2	554.1	3.63	11.69
1969	8	ON	OFF	4.28	70.9	647.9	6.40	11.35
		OFF	ON	4.60	86.0	666.4	6.60	10.77
		OFF	OFF	4.16	72.8	633.2	6.18	11.52
		ON	OFF	4.22	72.9	620.0	6.12	11.72
1971	9	ON	OFF	3.67	54.7	663.1	6.75	11.50
		OFF	ON	3.83	65.0	682.4	7.26	11.00
		OFF	OFF	3.52	57.0	644.4	6.36	11.73
		ON	OFF	3.39	55.4	652.5	6.54	11.65
1972	4	ON	OFF	5.21	73.0	670.6	5.69	10.99
		OFF	ON	6.18	95.8	684.0	6.04	10.35
		OFF	OFF	5.41	82.5	630.5	4.91	11.34
		ON	OFF	5.39	86.3	650.0	5.35	10.99
1973	9	ON	OFF	3.54	65.4	701.4	4.50	10.74
		OFF	ON	3.72	66.5	732.8	5.27	10.32
		OFF	OFF	3.35	59.4	697.8	4.42	10.91
		ON	OFF	3.43	65.2	711.0	4.48	10.62
1974	5	ON	OFF	2.76	30.5	761.3	3.97	10.67
		OFF	ON	3.35	41.7	810.7	4.89	9.88
		OFF	OFF	2.61	30.0	741.2	3.45	10.94
		ON	OFF	2.46	26.3	746.9	3.52	10.95
TOTAL	40	ON	OFF	4.23	67.9	670.1	5.35	11.10
		OFF	ON	4.53	77.1	692.2	5.81	10.62
		OFF	OFF	4.10	67.5	653.2	5.03	11.35
		ON	OFF	4.06	68.1	658.4	5.13	11.26

EMISSION RESULTS IN GRAMS PER MILE
FUEL ECONOMY IN MILES PER GALLON
FUEL ECONOMY CALCULATIONS ASSUME A 1:1.85 CARBON:HYDROGEN RATIO

* NOX Corrected for Humidity

Table 57

FY 73 EMISSION FACTOR PROGRAM-LOADED VEHICLE TESTS IN DETROIT

EMISSIONS IN GMS/MI - FUEL ECONOMY IN MI/GAL

Surveillance Driving Sequence

		TEST #1*				TEST #2**				TEST #3***			
YEAR	NO.	HC	CO	NOX	Fuel Economy	HC	CO	NOX	Fuel Economy	HC	CO	NOX	Fuel Economy
1967	6	7.0	109.3	4.73	12.5	7.55	139.6	4.51	11.4	8.93	211.3	5.28	8.7
1968	6	14.86	96.0	6.72	12.3	15.57	110.4	6.93	11.3	18.76	177.4	8.25	8.8
1969	6	3.93	48.7	8.60	14.4	4.15	54.3	9.09	13.6	5.22	96.7	10.09	10.4
1970	6	3.31	43.6	8.25	13.0	3.46	52.8	8.43	12.4	4.04	99.7	9.33	9.6
1971	6	2.90	38.0	8.53	12.7	3.29	48.9	8.55	12.0	5.04	102.1	9.29	9.4
1972	6	2.75	51.2	7.20	11.7	2.95	62.8	7.51	10.9	3.65	118.1	7.78	8.8
1973	6	3.19	62.3	5.89	11.5	3.36	65.6	6.36	11.0	4.17	124.8	6.85	8.6
TOTAL	42	5.42	64.2	7.13	12.5	5.76	76.3	7.34	11.7	7.10	132.9	8.12	9.1

* Test 1 - Inertia weight and road load settings unchanged from the Federal Register.

** Test 2 - Test 1 condition with the addition of a maximum rated load of passengers and baggage (500 lbs).

*** Test 3 - Test 1 condition with the addition of a trailer of a size recommended as suitable for that particular vehicle (1000 lbs). In this test, an empirically derived additional road load setting was applied.

APPENDIX

FY72 EMISSION FACTOR PROGRAM
COMPOSITE EMISSION LEVELS FOR ALL CITIES EXCLUDING DENVER AND LOS ANGELES
1972 FTP

YEAR	N	MEAN MILES (K)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	SD	GEOMETRIC MEAN	SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	SD	GEOMETRIC MEAN	SD	NOX GM/MI ARITHMETIC MEAN	SD	GEOMETRIC MEAN	SD
1966	68	71.7	0	1	47	10.94	8.84	8.81	1.72	109.46	53.59	97.82	1.63	3.09	1.54	2.67	1.82
1967	72	67.0	0	3	49	8.64	5.16	7.78	1.54	103.63	39.26	95.95	1.51	3.38	1.64	3.02	1.64
TOTAL	140	69.3	0	2	48	9.56	7.11	8.25	1.63	106.46	46.69	96.85	1.57	3.24	1.59	2.84	1.73
1968	84	57.9	10	14	32	6.85	5.49	5.73	1.72	75.84	41.25	65.97	1.78	4.12	1.67	3.75	1.57
1969	88	51.2	17	13	17	5.54	3.14	5.24	1.43	78.73	41.34	67.23	1.69	4.88	1.90	4.43	1.62
1970	108	38.8	21	24	21	5.64	5.04	4.71	1.68	66.15	45.67	55.16	1.82	4.16	1.61	3.85	1.51
1971	120	26.4	37	26	22	4.41	2.50	4.00	1.50	60.42	39.45	50.94	1.81	4.24	1.57	3.89	1.58
1972	140	14.8	60	52	17	3.42	2.50	3.03	1.63	43.79	25.84	36.31	1.91	4.52	1.55	4.23	1.47
TOTAL	540	34.4	32	28	21	4.96	3.95	4.22	1.89	62.31	40.40	51.55	1.89	4.38	1.66	4.03	1.55

FY72 EMISSION FACTOR PROGRAM
EMISSION LEVELS FOR DENVER
1972 FTP

YEAR	N	MEAN MILES (K)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	SD	GEOMETRIC MEAN	SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	SD	GEOMETRIC MEAN	SD	NOX GM/MI ARITHMETIC MEAN	SD	GEOMETRIC MEAN	SD
1966	17	50.6	0	0	71	10.97	7.41	9.64	1.59	132.73	55.71	122.91	1.49	2.40	1.57	1.92	2.07
1967	18	69.8	0	0	83	15.23	9.55	13.16	1.70	172.00	51.43	165.38	1.24	1.67	3.90	1.43	1.81
TOTAL	35	60.3	0	0	77	13.16	8.73	11.31	1.68	152.93	56.39	143.04	1.46	2.02	1.31	1.65	1.95
1968	21	61.4	0	0	62	9.23	5.22	7.22	1.62	121.51	63.14	103.60	1.74	2.68	1.30	2.37	1.71
1969	22	48.1	5	0	73	6.98	1.60	6.67	1.29	113.92	42.50	105.31	1.30	2.79	1.38	2.50	1.60
1970	27	31.6	0	0	48	5.26	1.72	5.15	1.30	102.35	37.78	96.49	1.45	3.18	1.39	3.00	1.44
1971	30	18.2	0	7	53	5.89	2.18	5.59	1.37	92.24	44.15	83.11	1.58	2.76	1.34	2.48	1.58
1972	35	14.1	14	9	49	5.61	4.34	4.97	1.63	90.42	35.79	82.84	1.58	3.20	1.37	2.71	1.60
TOTAL	135	29.6	5	4	58	6.43	3.41	5.92	1.46	101.95	49.79	92.10	1.57	2.90	1.29	2.62	1.58

FY72 EMISSION FACTOR PROGRAM
EMISSION LEVELS FOR LOS ANGELES
1972 FTP

YEAR	N	MEAN MILES (K)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	SD	GEOMETRIC MEAN	SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	SD	GEOMETRIC MEAN	SD	NOX GM/MI ARITHMETIC MEAN	SD	GEOMETRIC MEAN	SD
1966	17	73.3	12	6	47	7.97	11.31	5.56	1.96	38.81	42.27	38.84	1.67	3.41	1.97	2.91	2.03
1967	18	68.7	28	11	28	5.25	4.75	5.33	1.34	87.77	52.25	74.25	1.84	3.70	1.75	3.27	1.72
TOTAL	35	69.7	20	9	37	7.09	8.50	5.33	1.93	93.13	47.30	81.01	1.78	3.56	1.84	3.24	1.87
1968	21	55.0	14	19	19	7.63	5.54	6.29	1.77	71.74	22.31	64.77	1.61	4.34	1.96	4.54	1.55
1969	22	49.5	18	9	14	6.24	5.50	5.37	1.86	84.25	22.63	77.95	1.53	4.60	1.65	4.36	1.39
1970	27	40.2	11	11	15	7.31	7.18	5.34	1.84	90.14	42.49	81.01	1.62	4.44	1.50	4.15	1.49
1971	30	22.1	33	10	27	4.34	1.77	4.24	1.44	69.29	25.38	65.12	1.43	3.78	1.02	3.65	1.33
1972	35	17.6	57	31	31	4.07	4.87	3.24	1.75	55.77	25.41	50.51	1.58	3.83	1.15	3.58	1.33
TOTAL	135	37.9	30	17	22	5.77	5.22	4.65	1.82	72.80	33.97	65.53	1.80	4.24	1.48	4.00	1.42

NOX CORRECTED FOR HUMIDITY

* LEVELS
HC 3.4 GM/MI
CO 39.0 GM/MI
NOX 3.0 GM/MI

FY72 EMISSION FACTOR PROGRAM
COMPOSITE EMISSION LEVELS FOR ALL CITIES EXCLUDING DENVER AND LOS ANGELES
1975 FTP

			HYDROCARBONS GM/MI				CARBON MONOXIDE GM/MI				NOX GM/MI			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1966	68	71.7	9.55	8.65	7.80	1.77	95.66	45.86	86.03	1.66	3.19	1.61	2.75	1.82
1967	72	67.0	7.84	6.81	7.03	1.54	91.43	34.17	84.70	1.52	3.48	1.89	3.11	1.84
TOTAL	140	69.3	8.67	6.97	7.40	1.65	93.48	40.18	84.86	1.58	3.34	1.65	2.93	1.73
1968*	34	57.9	6.18	5.01	5.14	1.75	64.90	34.94	55.25	1.80	4.32	1.71	3.94	1.58
1969	88	51.2	4.83	2.53	4.44	1.47	62.28	34.18	54.27	1.72	5.08	1.93	4.66	1.56
1970	108	38.8	4.85	4.21	4.14	1.65	53.23	36.87	44.22	1.84	4.25	1.67	4.54	1.48
1971	120	28.4	3.96	2.22	3.59	1.69	51.13	37.32	42.18	1.86	4.30	1.58	3.95	1.58
1972	140	14.8	3.02	2.22	2.69	1.60	38.88	24.04	29.74	1.99	4.55	1.59	4.25	1.48
TOTAL	540	34.4	4.39	3.45	3.75	1.67	51.78	34.64	42.27	1.93	4.50	1.70	4.15	1.53

FY72 EMISSION FACTOR PROGRAM
EMISSION LEVELS FOR DENVER
1975 FTP

			HYDROCARBONS GM/MI				CARBON MONOXIDE GM/MI				NOX GM/MI			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1966	17	50.6	9.78	6.60	8.58	1.50	123.56	54.33	113.58	1.52	2.30	1.50	1.79	2.17
1967	18	59.8	12.92	9.46	11.78	1.76	157.52	51.83	149.66	1.29	1.77	1.10	1.47	1.92
TOTAL	35	55.3	11.31	8.25	10.10	1.71	141.33	55.33	130.99	1.48	2.03	1.37	1.62	2.03
1968	21	51.4	6.39	3.70	6.28	1.51	101.43	68.82	87.81	1.70	2.86	1.25	2.62	1.54
1969	22	46.1	5.97	1.28	5.83	1.25	97.80	38.11	90.31	1.53	2.93	1.47	2.61	1.65
1970	27	31.6	5.66	1.56	5.37	1.30	97.52	31.24	92.39	1.43	3.22	1.11	3.14	1.43
1971	30	18.2	5.19	1.74	4.87	1.34	80.22	37.27	72.93	1.57	2.74	1.31	2.48	1.66
1972	35	14.1	4.75	2.42	4.39	1.45	80.36	32.46	73.45	1.57	3.08	1.29	2.78	1.60
TOTAL	135	29.8	5.64	2.33	5.20	1.41	87.91	41.28	79.79	1.56	2.79	1.31	2.72	1.56

FY72 EMISSION FACTOR PROGRAM
EMISSION LEVELS FOR LOS ANGELES
1975 FTP

			HYDROCARBONS GM/MI				CARBON MONOXIDE GM/MI				NOX GM/MI			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
YEAR	N	MEAN MILES (K)	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1966	17	72.0	7.46	17.38	4.97	2.03	88.90	43.27	78.30	1.74	3.43	1.90	2.82	2.25
1967	18	66.7	6.26	4.44	4.29	1.92	75.38	48.21	63.31	1.89	3.77	1.61	3.32	1.74
TOTAL	35	69.7	6.38	9.86	4.60	1.97	80.98	44.01	69.15	1.81	3.61	1.94	3.07	1.89
1968	21	65.0	6.97	5.50	5.66	1.38	60.05	29.10	53.06	1.70	4.31	1.31	4.53	1.58
1969	22	49.5	5.42	5.25	4.29	1.81	71.61	33.01	64.43	1.63	4.68	1.99	4.43	1.40
1970	27	40.2	5.64	6.45	5.25	1.84	78.47	38.22	69.91	1.65	4.46	1.59	4.13	1.53
1971	30	22.1	3.98	1.73	3.69	1.47	59.66	25.48	54.73	1.52	3.83	1.25	3.58	1.34
1972	35	17.6	3.58	4.24	2.80	1.80	48.68	24.06	41.16	1.87	3.81	1.21	3.65	1.25
TOTAL	135	37.3	5.10	4.32	4.05	1.84	62.37	31.84	54.56	1.68	4.26	1.50	4.00	1.44

*NOX CORRECTED FOR HUMIDITY

FY71 EMISSION FACTOR PROGRAM

COMPOSITE EMISSION LEVELS FOR ALL CITIES EXCLUDING DENVER AND LOS ANGELES

1972 FTP

YEAR	N	MEAN MILES (K)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
TOTAL PRE-68**	458	68.5	2	5	46	9.56	8.08	8.02	1.70	95.2	43.5	85.6	1.61	3.51	1.57	3.31	1.79
1968	99	68.5	22	49	29	9.40	7.82	5.10	1.75	78.91	42.98	62.59	1.92	4.31	1.69	3.69	1.78
1969	72	74.4	15	13	11	5.99	5.22	5.07	1.69	78.73	37.73	62.42	1.68	5.29	2.30	4.98	1.50
1970	70	74.5	31	34	4	4.22	1.99	3.91	1.49	55.16	28.72	48.68	1.88	5.32	1.83	4.77	1.38
1971	40	19.8	91	69	11	3.42	1.47	3.19	1.49	48.33	25.29	38.89	1.84	4.96	1.79	4.69	1.48
TOTAL	291	32.7	33	32	15	4.98	4.91	4.19	1.89	62.22	42.81	51.71	1.83	4.91	1.85	4.83	1.93

FY71 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DENVER

1972 FTP

YEAR	N	MEAN MILES (K)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
TOTAL PRE-68!	37	65.1	3	1	83	11.31	9.13	10.27	1.51	138.8	55.5	125.8	1.53	1.93	1.11	1.68	1.76
1968	19	62.1	4	3	93	9.74	9.44	9.20	1.53	126.42	58.05	114.88	1.98	2.38	1.21	2.19	1.98
1969	17	38.9	12	6	88	7.74	6.84	6.84	1.84	92.92	37.72	78.72	1.72	2.52	1.21	2.25	1.78
1970	17	78.0	6	1	94	7.49	4.63	6.91	1.70	110.14	34.74	103.44	1.45	2.72	1.13	2.64	1.59
1971	28	15.2	7	4	96	5.73	2.10	5.44	1.39	108.34	34.74	92.19	1.54	3.34	1.35	2.73	1.84
TOTAL	72	38.1	4	3	93	7.74	3.84	6.93	1.62	108.48	42.38	95.83	1.59	2.68	1.27	2.48	1.81

FY71 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR LOS ANGELES

1972 FTP

YEAR	N	MEAN MILES (K)	% BELOW LEVEL * HC	CO	NOX	HYDROCARBONS GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	CARBON MONOXIDE GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD	NOX GM/MI ARITHMETIC MEAN	ARITHMETIC SD	GEOMETRIC MEAN	GEOMETRIC SD
1966	16	45.7	19	19	38	9.72	4.94	9.02	2.00	78.12	38.29	70.65	1.81	3.23	1.49	2.91	1.84
1967	17	58.4	12	9	93	9.62	3.52	9.52	1.83	91.43	38.81	74.58	1.92	3.38	1.49	2.98	1.81
TOTAL	33	48.9	15	13	49	7.43	4.54	6.83	1.91	74.83	37.38	72.43	1.98	3.24	1.43	2.95	1.81
1968	15	37.3	13	13	40	5.89	2.21	5.24	1.49	78.08	34.77	69.87	1.81	3.76	1.94	3.34	1.84
1969	17	38.1	3	0	12	5.98	1.21	5.75	1.22	87.27	25.37	83.68	1.32	5.48	2.12	5.06	1.58
1970	16	25.2	25	19	13	5.22	2.74	4.76	1.51	98.34	24.45	96.23	1.83	4.51	1.88	4.23	1.49
1971	21	15.8	52	33	14	3.51	0.99	3.34	1.38	91.98	22.49	48.91	1.52	3.81	1.04	3.63	1.41
TOTAL	69	29.1	24	17	65	4.45	2.08	4.40	1.60	98.72	31.88	91.85	1.83	4.37	1.82	4.08	1.93

*NOX CORRECTED FOR HUMIDITY

*
LEVELS
HC 3.0 GM/MI
CO 39.0 GM/MI
NOX 3.0 GM/MI

** EXCLUDING CALIFORNIA 66-67

FY71 EMISSION FACTOR PROGRAM

COMPOSITE EMISSION LEVELS FOR ALL CITIES EXCLUDING DENVER AND LOS ANGELES

1975 FTP

YEAR	N	MEAN MILES (K)	HYDROCARBONS GM/MI				CARBON MONOXIDE GM/MI				NOX GM/MI			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
			MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
TOTAL PRE-68*	458	68.5	8.74	7.63	7.28	1.73	88.5	40.3	77.4	1.63	3.54	1.91	3.04	1.79
1968	99	48.5	5.73	7.88	4.48	1.77	89.33	41.37	52.81	2.02	4.44	1.89	3.95	1.72
1969	72	39.9	5.25	4.72	4.47	1.82	59.99	32.57	52.77	1.87	5.45	2.32	5.06	1.50
1970	70	29.5	3.77	1.83	3.50	1.44	47.55	24.41	41.37	1.73	5.15	1.87	4.89	1.38
1971	88	19.8	3.07	1.34	2.83	1.44	39.56	25.82	32.48	1.92	5.06	1.84	4.71	1.49
TOTAL	291	32.7	4.41	4.71	3.72	1.84	53.60	38.95	43.51	1.98	5.03	1.89	4.84	1.94

FY71 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR DENVER

1975 FTP

YEAR	N	MEAN MILES (K)	HYDROCARBONS GM/MI				CARBON MONOXIDE GM/MI				NOX GM/MI			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
			MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
TOTAL PRE-68*	37	65.1	10.18	5.39	9.24	1.69	125.9	48.5	117.4	1.51	1.89	1.12	1.61	1.79
1968	19	42.1	7.34	2.73	6.87	1.48	149.20	54.43	99.71	1.53	2.20	1.68	2.07	1.43
1969	17	38.9	6.31	3.47	5.43	1.84	78.42	47.87	95.81	1.74	2.59	1.24	2.27	1.76
1970	17	29.3	5.71	3.85	5.31	1.54	94.74	53.80	89.38	1.43	2.78	1.11	2.54	1.37
1971	20	19.2	4.54	1.42	4.42	1.24	98.13	39.98	98.87	1.57	3.85	1.59	3.73	1.42
TOTAL	72	30.1	5.48	2.97	5.28	1.57	92.20	43.74	82.98	1.80	2.87	1.45	2.48	1.68

FY71 EMISSION FACTOR PROGRAM

EMISSION LEVELS FOR LOS ANGELES

1975 FTP

YEAR	N	MEAN MILES (K)	HYDROCARBONS GM/MI				CARBON MONOXIDE GM/MI				NOX GM/MI			
			ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC		ARITHMETIC		GEOMETRIC	
			MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
1968	16	55.7	7.64	4.34	5.81	2.03	99.16	38.59	90.84	1.72	3.40	1.54	3.04	1.68
1967	17	58.4	5.33	3.32	4.60	1.70	87.18	38.99	79.68	1.63	3.42	1.50	3.08	1.65
TOTAL	33	48.9	6.55	4.26	5.15	1.88	98.28	38.23	84.29	1.68	3.41	1.50	3.06	1.65
1968	15	37.3	4.71	1.67	4.37	1.58	82.43	37.88	74.31	1.78	3.86	2.04	3.48	1.68
1969	17	38.1	4.92	1.87	4.68	1.25	88.78	42.67	83.13	1.41	5.48	2.26	5.10	1.47
1970	18	25.2	4.45	2.39	4.04	1.44	58.83	28.48	44.89	1.78	4.82	1.84	4.33	1.48
1971	21	15.8	3.82	3.79	2.93	1.28	42.28	19.91	37.63	1.84	3.83	1.18	3.65	1.41
TOTAL	69	28.1	4.19	1.75	3.98	1.45	55.15	28.25	48.83	1.67	4.42	1.81	4.08	1.53

NOX CORRECTED FOR HUMIDITY

*EXCLUDING CALIFORNIA 68-67